SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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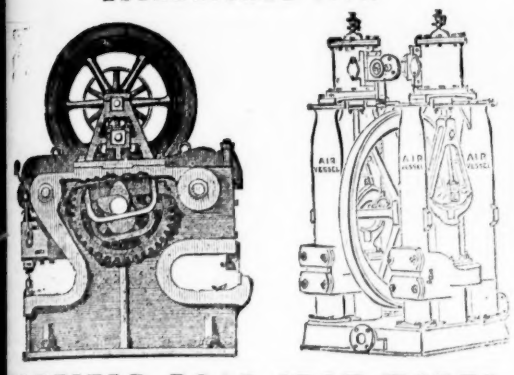

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PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

FALMOUTH, SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was 121·30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL: and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

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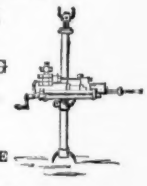

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WASTE HEAPS, consisting of refuse chats and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

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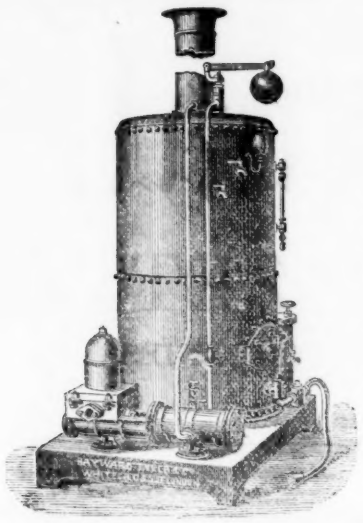

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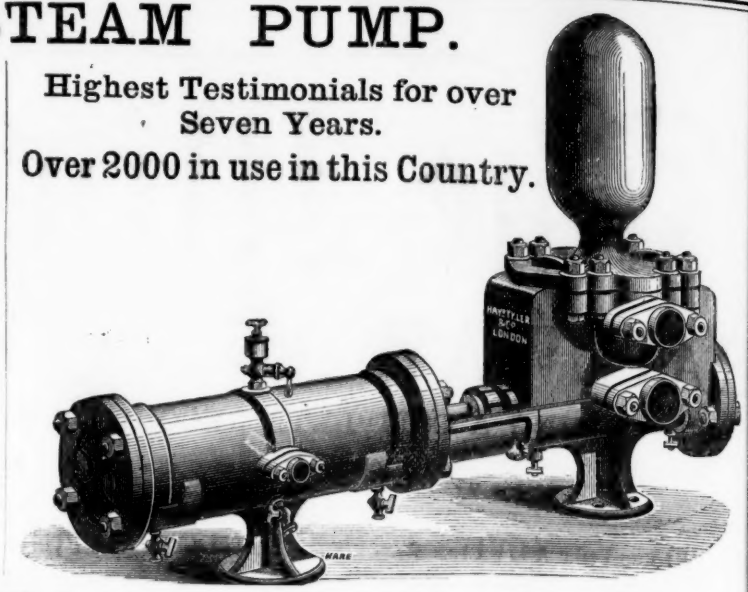

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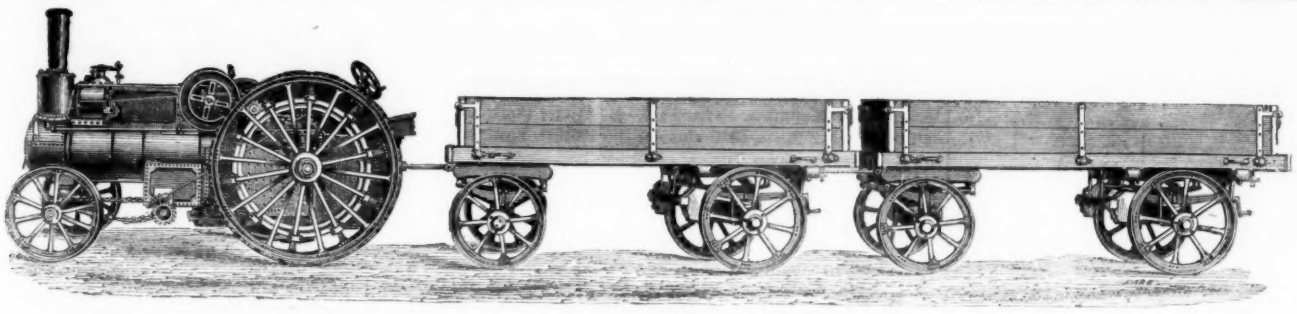

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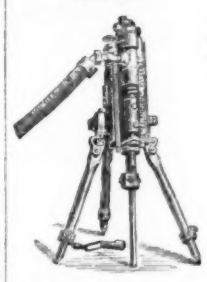

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The working parts are made of the toughest steel and phosphor-bronze—steel castings are also used—so as to combine strength with light weight.

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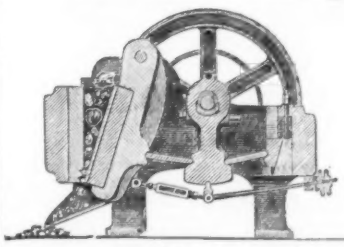
Patent Improved Blake Stone Breakers.

GUARANTEED NO INFRINGEMENT OF ANY PATENT.



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ROCK-BORING MACHINERY—No. XI.

The work already accomplished by means of rock-boring machinery includes every operation connected with mining other than "rising" or "stoping the lode." The successful application of boring machinery to these works is reserved for a future period. In wide bench stopes, such as prevail in some foreign mines, machines mounted on tripod stands might probably be advantageously employed in boring the shot holes.

TUNNELS.

1.—THE MONT CENIS TUNNEL, where for the first time rock-boring machinery was rendered permanently successful in 1861. Rock—Mica schist, quartzite, crystalline, and clay-slates. Dimensions of level—Height, 8 ft. 6 in.; width, 9 ft. 10 in.; length, 40,000 ft.; section of forebreast, 83½ ft.; number of holes bored in forebreast, 55 to 65; diameter of holes, 1⅜ in. at top, 1⅜ in. at bottom; depth of holes, 2½ ft. to 4 ft.; number of borers simultaneously employed, 10; number of strokes made by borer per minute, 250.

Fig. 16.

60 HOLES.

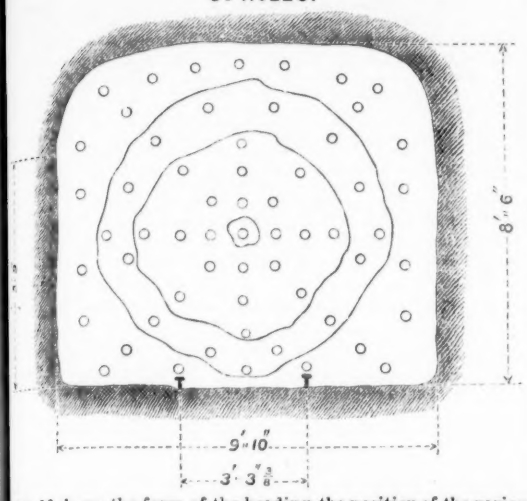
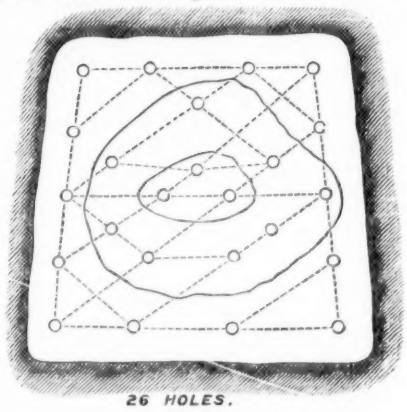


Fig. 16 shows the form of the heading, the position of the various shot-holes made around the axial line of the heading, and the rupturing lines of the blast. The cost of each boring machine was 80*l.*; compressed air consumed per machine, per 14 to 15 hours, 5500 to 6000 cubic feet; water required for drilling, 60 to 70 holes, 600 to 700 gallons.

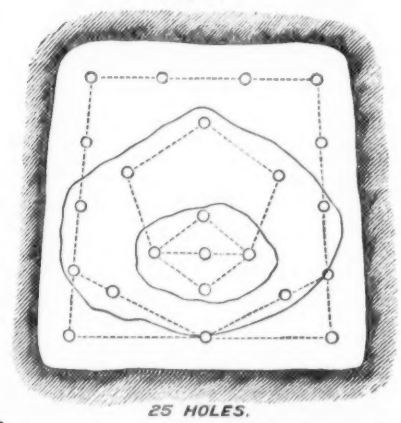
2.—ST. GOTHARD TUNNEL. Rock—Granite, and compact mica and other schists. Dimensions of level:—Goeschenen: Width, 9 ft. 10 in.; height, 8 ft. 2 in.; section of face, 79 square feet; number of borers employed, 6; average number of holes bored in forebreast, 26; depth of holes, 3 ft. 6 in. Airolo: Width, 8 ft. 6 in.; height, 8 ft. 2 in.; section of face, 69½ ft.; number of borers simultaneously employed, 6; diameter of holes, 1⅜ in. at top, 1 3-16th in. at bottom; average number of holes, 25; depth, 3½ ft. to 7 ft.; number of blows made per minute by the Ferroux borer, 350 to 400; by the François and Dubois, 300. Total length of tunnel when complete, 48,950 feet.

Fig. 17.



26 HOLES.

Fig. 18.



25 HOLES.

Fig. 17 represents the end of the Goeschenen level, perforated with 26 holes; and Fig. 18, the Airolo end, perforated with 25 holes.

3.—HOOSAC TUNNEL (in America). Length, 25,000 ft.; advance level, 9 ft. high, and 24 ft. wide; area, 216 square feet; number of boring carriages, 2; number of borers, 10; centre cut obtained by boring two series of holes, 9 ft. apart, and 9 ft. deep; number of holes in forebreast, 40; time of *one* advance, 24 hours; length of *one* advance, 7½ feet; pressure of air employed in boring machines, 80 lbs.

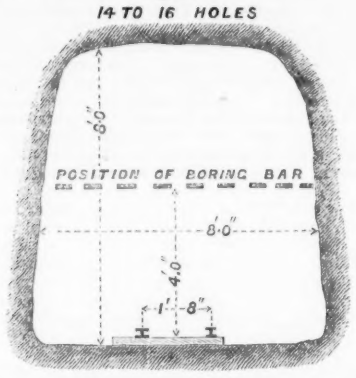
4.—SUTRO TUNNEL (Nevada, America). Depth below surface at intersection of Comstock lode, 1800 ft.; total length, about 20,000 ft.; length driven, 18,000 feet. Boring machines introduced in 1872. Rate of driving monthly, 305 ft., or 12 7-10ths ft. per day of 24 hours.

5.—MUSCONETCONG TUNNEL (see Figs. 13 and 14). Rock, syenite. Length driven through this rock, 1725 ft.; width of tunnel, 26 ft.; height, 8 ft.; net area of face, 175 square feet; contents per lineal foot, 525 cubic feet; diameter of bore-holes, 1½ in. to 2¾ in.; depth of holes, centre cut, 10½ ft.; squaring up holes, 12 ft.; roof holes, 9 ft. to 10 ft.; number of pounds of dynamite used to 36 holes—first quality, 25 lbs.; second quality, 245 lbs.—total, 270 lbs., or 7½ lbs. per hole; number of borers employed simultaneously, 6; strokes made per borer per minute, 300 to 400; diameter of cylinder of boring machines, 5 in.; pressure of air employed, 50 lbs. to 60 lbs.; time required to bore and blast holes, remove debris, and square ground, 32 hours; rate of advance for 24 hours, 6 ft. to 7 ft.

6.—SEVERN TUNNEL (Fig. 19). Rock—Pennant, or coarse sandstone; height of level, 8 ft., width 8 ft.; net area (say), 60 ft.; contents of a cut, 90 ft. to 120 cubic ft.; two boring machines employed; sectional area to one machine, 30 ft.; number of blows made by borer per minute, 300 and above; diameter of hole, 1½ in.; depth of holes, 18 in. to 24 in.; tool, × point; number of holes bored in three hours, 14 to 16; position of holes, variable; diameter of air main, 2 in.; diameter of galvanised sheet-iron exhaust pipe, 12 in.; exhauster, a large fan; duration of shift, 8 hours; number of shifts in 24 hours, 3; forebreast of level from shaft, 800 to 900 yards; depth of shaft, 200 ft.; length of tunnel when complete (say), 4 miles.

Fig. 19.

14 TO 16 HOLES



7.—MINES AND COLLIERIES (the Altenberg Zinc Mines, Aix-la-Chapelle). Rock—Hard grauwacke schist; a cross-cut 290 ft. from surface; length, 413 ft.; height, 7 ft. 3 in.; width, 7 ft. 3 in.; area of forebreast, 52½ ft.; number of borers employed, 2; diameter of holes, 1⅜ in. at top, 1 in. at bottom; depth of holes, 1 ft. 8 in. to 3 ft.; number of holes in forebreast for one advance, 10 to 12; number of blows made by Sach's borer per minute, 250 to 400.

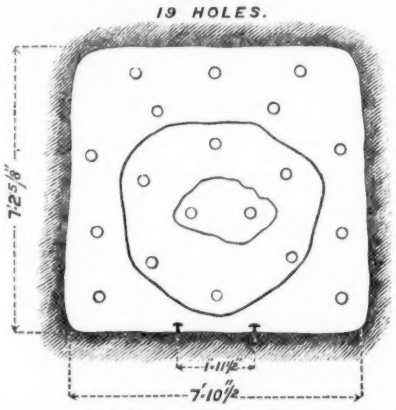
8.—PERSEBERG MINES (Sweden). In 1867 a level driven 9 ft. by 8 ft.; area of face, 72 square feet. Rock—Garnet, hornblende, augite, and epidite; number of borers employed, 1; diameter of hole, 1⅜ in.; depth, 2 ft.; number of holes bored in a shift, 8 to 10; number of blows made by Bergström's machine, 200 to 300 per minute.

9.—SHAFT AT SALZBACH ALTENWALD (Saarbrück, in 1867). Sandstone, coal shales, hard conglomerate, and quartzite; width, 8 ft. 8 in.; length, 20 ft.; depth of shaft, 200 ft.; area of shaft at bottom, 175½ ft.; number of borers employed, 1; diameter of hole, 1⅜ in. at top, 1⅜ in. at bottom; average number of holes per sink, 10; depth of holes, 21 to 24 in.; number of holes made by Sach's machine per minute, 300.

10.—ST. LEONARD'S, ANZIN (France, 1868, Fig. 20). Coarse grain sandstone; level, 336 ft. from surface; width at bottom, 6 ft. 6 in., at top 6 ft.; height, 6 ft. 6¾ in.; section of forebreast, 42½ ft.; number of borers employed, 1; diameter of holes at top, 1⅜ in., at bottom 1⅜ in.; depth of holes, 2 ft.; number of holes in face of level, 5; number of blows made by Sach's machine per minute, 250. Also at Anzin, in 1869. Two levels—One, 390 ft.; the other, 990 ft. deep; length driven, 6500 ft. Rock—Stratified schist and sandstone; height of level, 7 ft. 3 in.; width, 7 ft. 10½ in.; area of forebreast, 57 ft.; number of borers employed, 4; diameter of holes at top, 1¾ in., at bottom 1⅜ in.; depth of holes, 5 ft. to 6 ft.; number of holes in forebreast, 19; number of blows made by Dubois and François borers per minute, 150 to 200.

Fig. 20.

19 HOLES.



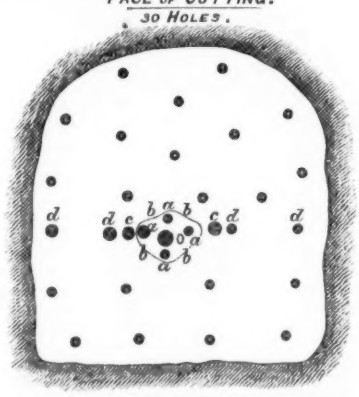
11.—MARIHAYE (Belgium). Levels—One, 1350 ft. deep; the other, 1470 ft.; more than 6500 ft. driven. Rock—Coal schist and sandstone, the latter enclosing fine grains of quartz; width of level, 7 ft. 3 in.; height, 7 ft. 3 in.; area of forebreast, 52½ ft.; number of borers employed, 4; diameter of hole, 1⅜ in.; depth of hole, 3 ft. to 4½ ft.; number of holes in forebreast, 20 to 30; number of blows made by borer per minute, 250.

12.—MARIE COLLIERY (Belgium, Fig. 21). Driving level from shaft; width of level, 5½ ft.; height, 6 ft. 6¾ in.; area of face, 34 square feet; number of borers employed, 4; diameter of hole at top, 1½ in., at bottom 1½ in.; depth of hole, 6 ft.; number of holes in forebreast, 30; number of blows made by Dubois and François' borers per minute, 250.

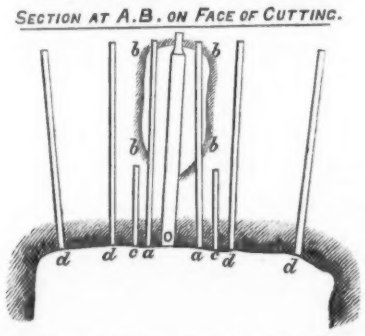
Fig. 21.

FACE OF CUTTING.

30 HOLES.



SECTION AT A.B. ON FACE OF CUTTING.



13.—PIERRE DENNIS PIT (Marihaye). Level, 600 ft. deep. Rock—Coal shales and grit; width of level, 5½ ft.; height, 6 ft.; area, 31 square feet; holes, 1½ in. diameter; depth, 6 ft. A second level 1352 ft. deep; width, 7½ ft; height, 7½ ft.; area of face, 62½ ft.; number of borers employed, 4; holes at bottom, 1½ in. diameter; depth, 6 ft.; number of blows made by borer per minute, 250 to 300.

14.—STAHLBERG, MUSEN (Prussia). Sinking shafts and driving levels. Rock—Hard cystalline grauwacke and quartzite. Length of air pipes, 2700 ft.; diameter of pipes, 2½ in.; sink, 8 ft. long and 5 ft. wide; area, 40 square feet; number of borers employed, 1; diameter of hole, 1½ in.; number of holes bored per shift, 8; average depth of hole, 2 ft.; number of blows made by Sach's machine per minute, 300 to 400.

15.—GOULEY COLLIERY (Aix-la-Chapelle). Level, 1380 ft. from surface. Rock—Hard sandstone and tough slate. Dimensions of level, 8 ft. by 8 ft.; area, 64 square feet; number of borers, 1; diameter of hole, 1½ in.; number of blows made by Sach's machine per minute, 350 to 400.

JOHN DARLINGTON.

ROCK-BORING.

SIR,—In your Report from Cornwall, in last week's Journal, it is stated that the cost of rock-boring with the Barrow Borer is rather less, and with the Beaumont Borer rather more, than hand-labour. These statements, if correct, show such a different result to that obtained at the Rushen Mines, Isle of Man, that I think a comparison of the costs and progress by machine as against hand-labour will be of interest.

The Darlington Rock Borers are used, and the various novel appliances for effectually working them were also designed by Mr. Darlington. The work is sinking a shaft from a 36 to a 60 fathom level; the diameter of the shaft is 10½ feet. The last hand-labour price paid for this shaft was 33*l.* per fathom; the average of the last three months of sinking was 31*l.* The machine price as now set by contract is 13*l.* per fathom, and at that price the men are earning far higher wages than they did by hand-boring. The men find all materials except coals for compressor, which adds 1*l.* per fathom to the cost.

COMPARISON OF COST.

Hand-labour cost per fathom	£31	0	0
Machine	14	0	0
Saving by machine boring	£17	0	0

RATE OF PROGRESS PER WEEK.

Hand-labour	0 fms.	2 ft.	4 in.
Machine	2 fms.	0 ft.	0 in.

Owing to the hindrance caused by our small drawing engine being unable to draw the stuff broken sufficiently fast (80 hours of last week having been required to draw the rock broken), the progress, though five to six times that of hand-labour, will be much increased when the new drawing engine is complete.

No doubt Capt. Barkell, whose energy and skill in carrying out the operations has received the special thanks of the proprietors, would give you the full details of the electric blasting and other improvements adopted at these mines by Mr. Darlington; but his time may be too much occupied to do so till the shaft is completed—it is now down 16 fathoms.

I may add that I have no interest in any borer beyond a desire for the survival of the fittest for our mines; but I must say that, for simplicity and fitness for the rough usage inevitable in mines, the Darlington Borer seems to be excellent. FREDK. J. KING.

Bishopsgate Avenue, London, Nov. 21.

SEPARATING SILVER FROM COPPER WITH GLUE.

SIR,—Although I have heard of many curious things being suggested as improvements upon the metallurgical processes in common use, I feel compelled to admit that the utilisation of glue for separating silver from copper is a decided novelty; though, from the fact of its having been not only suggested but patented by Mr. E. L. Mayer, of Glasgow, I suppose there is really something in the proposition. His primary object is to treat cupreous solutions containing silver, and such as are obtained in treating cupreous pyrites by the wet way for extracting copper, and to separate the silver therefrom by an improved, rapid, and convenient method. The new process is based on a discovery which Mr. Mayer has made of the use of a new compound in which silver, certain nitrogenous substances, and iodine are chemically combined, and are not separable by any process which does not involve chemical decomposition. The nitrogenous substances which may be used are of the class of organic substances to which glue and albumen belong, and in practice he finds that glue is the most suitable substance.

Mr. Mayer tells me that his process consists essentially in adding glue, or its substitute, and an iodide, or a suitable compound of iodine, to the cupreous solution or "copper liquor" in such a manner that the glue, or its substitute, and the iodine may combine with the silver present in the cupreous solution, and so form the new chemical compound or compounds which separates from the cupreous solution as a precipitate. Compared with processes previously employed for the same purpose, his improved process has the advantages that it is practically applicable to cupreous solutions which are highly concentrated, that the precipitates can be separated in a very short time, and that the loss of iodine is comparatively slight. The larger portion of the compound or compounds of silver, glue, and iodine is rapidly deposited, and can be separated by decantation or filtration, whilst any of the glue or compound of silver, glue, and iodine that remains in solution can be precipitated by means of tannin, or any suitable substance containing tannin.

It will, of course, be understood that inasmuch as the raw material with which Mr. Mayer has to deal varies occasionally, there are corresponding variation in details in the process, but he finds that he can operate with great advantage upon cupreous solutions which are made as concentrated as is conveniently possible when lixiviating the calcined or furnaced materials as practised in the wet process of extracting copper. He takes, for example, a cupreous solution of which the approximate analysis is:—Sodium sulphate, 9·66 per cent.; sodium chloride, 17·96; copper, 6·78; lead, ·506; iron, ·045; cobalt, nickel, manganese, zinc, as oxides, 3·46; chlorine, 10·89; silver, ·004 per cent. Specific gravity 63·5° Twaddell at ordinary temperature.

The cupreous solution is conveyed to a mixing tank provided with mechanical stirring apparatus of any convenient known kind, and the stirring apparatus is set in motion preferentially before adding the glue and iodide. A convenient size of tank is one containing 230 or 240 cubic feet of liquor, and assuming that to be the quantity of liquor to be operated on at once, and that it is of the composition indicated in the preceding analysis, he adds to it from 1 to 2 lbs. of glue, and a solution of potassium iodide or other convenient iodide containing about 12 ozs. of iodine. The glue and the iodide may be dissolved separately, and the solutions be mixed, or one may be dissolved in the solution of the other, heat being employed, if necessary, to produce the solution of the glue. The mixed or joint solution is made with about as much water as to occupy a cubic foot. After the compound solution of glue and iodide has been thoroughly mixed with the cupreous solution the contents of the tank are transferred to a first settling tank, which is by preference somewhat larger than the mixing tank. The liquor is left undisturbed in the first settling tank for about an hour, during which time the larger portion of the compound of silver, glue, and iodine settles to the bottom, and then the liquor is drawn off at a point about 1 ft. above the bottom of the tank, and is conveyed to a second settling tank of still greater capacity than the first settling tank. In the second settling tank a solution containing ¼ lb. to ½ lb. of tannin, or an infusion of galls or sumach, or any infusion or solution containing tannin, or any astringent principal having an analogous action and of equivalent strength is added to the liquor principally for the purpose of expediting the precipitation of the remainder of the compound of silver, glue, and iodine formed in the liquors. After the liquor has been left undisturbed for from 1½ to 2½ hours in the second settling tank, it is drawn off at a point 1½ to 2 feet above the bottom of the tank, and being then practically free from silver can be treated in the usual way for the precipitation of the copper. Several fresh quantities of cupreous solution may be similarly treated in the tanks without removing the precipitates, which may accumulate for about a week or longer. The precipi-

tates taken from the mixing and first and second settling tanks are conveyed to a fourth tank provided with a perforated bottom, which is covered with iron ore, or other suitable filtering material, this perforated bottom being 2 or 2½ feet above the actual bottom of the tank. The precipitate is then covered with dilute acid, which is pumped over it as often as may seem necessary, the pump drawing from about 8 in. below the perforated bottom. This arrangement allows any precipitate which may go through the filter to settle and remain undisturbed at the bottom of the tank, whence it can be removed when convenient. The acid used is the same as is employed in lixiviating the calcined materials, and its purpose is to dissolve out any copper salts that are mixed with the precipitate.

When the acid no longer dissolves the copper rapidly from the precipitate, it can be utilised and be saturated with copper salts by employing it for lixiviating the calcined materials. Fresh dilute acid is repeatedly run through the precipitate until all the copper salts are dissolved out. The washed precipitate which now contains, besides the compound of silver, glue, and iodine, chiefly lead salts and lime salts, is removed, and the iodine recovered from it. He treats the precipitate for the recovery of the iodine by placing a quantity of the precipitate in a drum, which is about 4 ft. in diameter and 3 ft. in length, and can be turned about its axis, which is placed horizontally. After neutralising any free acid in the precipitate with slaked lime, or otherwise, he adds a solution of sulphides, taking by preference, where conveniently obtainable, the solution of sulphides obtained by lixiviating oxidised alkali waste. The sulphide solution having been added, the drum is turned slowly, and after it has rotated for some time it will be found that all the sulphides have disappeared from the solution, whilst sulphates, chlorides, and iodides have taken their place. The liquor can then be removed, and may be used instead of fresh solution of potassium iodide for the precipitation of further quantities of silver from fresh cupreous solutions with the aid of the proper proportion of glue or its substitute. A fresh quantity of sulphide solution is next put into the drum and worked as before, and the process is repeated until all the iodine has been recovered, as a soluble iodide, from the silver precipitate, after which the precipitate, then consisting principally of sulphides of heavy metals, is removed from the drum and a fresh quantity of undecomposed precipitate is put into it. The sulphides containing the silver may be sold without further treatment, or they may be smelted or otherwise treated to recover the silver in the metallic state in which it will be found mixed with lead, and containing part of the gold which was in the cupreous solution.

Another great advantage of Mr. Mayer's process is that the commonest glue can be used, and the proportion of glue may be varied to some extent without affecting the result. The different qualities of glue or isinglass require different proportions, and these must be ascertained by actual trial. The glue or its substitute should be somewhat more than sufficient in every case to combine with all the silver ascertained to be present in the solution to be treated. The quantity of glue has only to be regulated to correspond with the silver.—*Glasgow, Nov.* 19. ——— FRECNDIN.

MAJOR MAJENDIE'S REPORT ON THE BURNBANK EXPLOSION.

SIR,—It is to be regretted that when parties undertake to communicate to respectable journals what purports to be the particulars and contents of public documents they should not do so accurately, and should, on the contrary, give garbled statements only, with misleading titles. I was somewhat startled to see in your last week's Journal what professed to be the substance of Major Majendie's report on the explosion which took place at Burnbank, Hamilton, in June, 1876, with the prominent heading "Instability of Nitroglycerine Compounds—the Dynamite Explosion at Hamilton," from which it might be inferred that dynamite being a nitroglycerine compound had proved to be of an unstable character, and that it was owing to its instability that the explosion had taken place, and I anxiously looked through the article to see if Major Majendie was led to suppose that spontaneous combustion had taken place, but I could find no trace of anything of the kind. I have succeeded after some difficulty in getting sight of a copy of the report itself, for as it has not up to the present time been presented to Parliament, it cannot be obtained from the parliamentary publishers.

On carefully reading the report I find not only that the above title, or heading, does not appear on it but that it does not contain anything to justify its adoption by your correspondent. The report states expressly that some dynamite had been deposited in a store, which was not constructed or situated as required by the license, and that this store had been partially flooded during the winter, and the dynamite contained therein damaged thereby, and no one can wonder that it should be. If gunpowder, tonite, or any other explosive had been deposited in this flooded magazine, which is described as having mud and water collected in it, it must also have been damaged; the nitre they contain would have dissolved, and no one can suppose that they would have remained stable. If, therefore, the article in your Journal had been entitled "Instability of Explosives when Submerged in Flooded Magazines" no exception could have been taken to it, but the title "Instability of Nitroglycerine Compounds" appears to have been adopted for the purpose of misleading and creating unmerited prejudice. The article itself is, moreover, a garbled and misleading epitome of the report itself.

Major Majendie, while referring to the well-known fact that "contact of water with dynamite is simply an established means of extracting the nitroglycerine from it," is careful to show that "the packing of dynamite and kindred explosives" now adopted in accordance with the regulations made under the Explosives Act by the order of the Secretary of State, No. 3, prevents the possibility of any dynamite coming in contact with water. He also quotes Dr. Dupre's report as to the purity of the dynamite, and states that "all idea of this explosion having been the result of spontaneous combustion of impure dynamite may be confidently dismissed."

In the result, therefore, instead of decrying dynamite as being unstable, his report is a strong certificate to the contrary. He shows that the Government analyst found it to be pure and stable in quality, and he also shows that the waterproof packages now adopted effectually protect it from disintegration by water and damp; it is, indeed, a well accredited fact that some cases which were thrown overboard from a vessel in the Channel, after being tossed about for some time in the sea, were washed ashore on the coast of France, and on being opened were found to contain dynamite as sound as the day it was issued from the manufactory. My confidence in dynamite is not, therefore, to be shaken by the misleading and unfounded insinuations of your correspondent.

Redruth, Nov. 21. A LARGE CONSUMER OF DYNAMITE.

EXPLOSIVES—DYNAMITE, GUNCOTTON, TONITE.

SIR,—It is rather amusing to those who are well acquainted with the relative merits of explosives generally to see the poor attempt thot is made by the writer who signs himself "Caution," in last week's Journal, to run up the advantages of dynamite over guncotton or tonite, and more especially as in the same number of the Journal (page 1271) we have Major Majendie's report on the plastic or oily substance "Caution" so praises up. It appears from that report that it would have been very fortunate for the proprietors of the magazine and all concerned in the sad accident if the dynamite "Caution" so highly commends had been a little more rigid; it would then have saved the lives of those poor fellows, besides the owners' property and the character of the explosive.

No doubt "Caution" has been a reader of the Journal for some time, and if so I beg to refer him to a letter of mine in the Journal of December 18, 1875, when I said—"It (tonite) could be compressed by stemming with a wooden or copper rammer." Iron rammers are prohibited by the Mines Regulation Act, and should never be used with any explosive. At that time loose cotton powder was in use, but now solid cartridges only are in the market. The latter is the subject of "Caution's" comments, and I am afraid he is either not a careful reader, or has hastened to write to the Journal immediately after the information came to his hand, which could not have been transmitted to the Journal until ten days after the publication of the paper he refers to as containing another "cause" for caution.

To my mind his letter looks like the effusion of a man who is anxious to write to newspaper, but does not often get an opportunity to do so upon a subject in which he is interested, and when an opportunity serves he does not hesitate to rush into print with either old or incorrect news. If what I have heard be true the accident he refers to was caused by the recklessness of the man who was operating with the powder. There is no more reason or sense in condemning a commodity which causes accident through carelessness than a pistol which causes the death of a suicide. I can and do agree with "Caution" that it is dangerous to force any explosive down a bore-hole, and it should never be done, and in the case of tonite it is quite unnecessary. One of the rules for its use is—take a cartridge the size of the bottom of the bore-hole. If this is done I believe it to be an explosive quite free from danger, fit for use at all times of the year, and all that is necessary is to keep the powder dry, use the detonators sent with it, and a sound fuse, when good results are sure to follow.

I will now conclude by referring to my letter in the Journal of Feb. 5, 1876, and rule 12, where the kind of explosion, the subject of Major Majendie's report, is provided against. I may add that no doubt Mr. Mowbray was quite right when he considered it prudent when destroying nitroglycerine empty cases to remove them to a safe distance, and the author of the article in the Journal had good reason for heading it "Instability of Nitroglycerine Compounds."

Faversham, Nov. 20. ——— FAIR.

WELSH GRANITE, AND STREET PAVEMENTS.

SIR,—Dr. Nolan in the Journal of Saturday last calls attention to the very important subject of Asphalte and Wood Pavement, and refers to a few of the numerous complaints daily expressed in the streets, and more particularly in the main thoroughfares, of our Metropolis. I have been engaged for some years in the development of Welsh granite quarries, producing nothing but street paving-stone, consequently the various trials made of late in London and several other of our principal cities and towns to supersede the use—at least to a great extent—of granite by the employment of first asphalte, and more recently wood, for street pavements have not been without interest, and occasionally a little anxiety to me. The Welsh granite trade, however, has during the last 10 years been a very profitable and increasing business, and during the past five years, while all the costly experiments have been going on in testing the relative merits of asphalte and wood as rivals to granite pavement, the demand for Welsh granite, strange to say, has increased to such an extent that at the present time it seems as if 1-20th of the demand will not for many years be adequately met. I need hardly say that the essential requisites for a good street pavement are, that it shall be smooth and hard in order to promote easy draft; that it shall give a firm and secure foothold for animals, and not become polished and slippery from use; that it shall be noiseless, and as free from mud and dust as possible; and that it shall be easily cleansed, and shall not absorb and retain the surface liquids, but facilitate their prompt discharge into the side-gutters and catch-basins. It should also be of such material and construction that it can be readily taken up in places and quickly and firmly relaid, affording immediate access to water and gas pipes. Economy of maintenance and repair necessarily demands that the material at the surface shall be durable.

That all road and street coverings hitherto employed are wanting in one or more of the most important of the foregoing qualities no one will doubt, but how these qualities can be combined in any really practical and permanent degree in asphalte or wood pavement I venture to say no one who has been unfortunate enough to be pecuniary interested in bringing these materials into the market as rivals to the now improved granite pavements of Liverpool, Manchester, and Dublin, will attempt to explain. The following are the most important points to keep in view:—1. Durability.—2. Economy.—3. Safety to man and beast.—4. Noiselessness.—5. Freedom from mud and dust.—6. Cleansing.—7. Wear and tear to horses and vehicles.—8. Tractive force.

Now, Sir, out of these eight essential qualities I do not see but one that can, in my opinion, be claimed for either the asphalte or the wood pavements, and that is less noise; in the traffic there is also less vibration and jolting of cabs, which, of course, affords somewhat more comfort to the passenger. Yet, I imagine most people would prefer to put up with a little oscillation, and a jerk or two occasionally, to being thrown headlong into the street, with a good chance of having one's neck broken by the downfall of the horse from the slipperiness of the street. There might also seem to be less tractive force required both on wood and asphalte; as, however, there is not so good a foothold or grip on a smooth surface, such as asphalte or any other hard and smooth surface, I doubt if any advantage is gained in this respect over a good granite pavement, while I presume no one will now doubt the advantages of granite pavement in all of the other qualities.

The new pavements now being laid in Liverpool consisting of the grey Welsh granite are reported to be by far the finest in the kingdom; this stone is obtained from several quarries on the cliffs of Carnarvon Bay, and not from the old Penmeanmawr Whinstone Quarries, which are giving way to the more recently discovered granite at Llanbarian Bay, Clynnog, Porth Nant, Pystill, and Nevin granite quarries The proprietor of one of the principal quarries at Penmeanmawr has lately acquired the Port Nant Quarries, and is introducing much spirit and activity in their development. A large number of workmen's cottages and other buildings have just been erected near the quarries, and are already assuming a village-like appearance. The Welsh granite, especially that obtained from the cliffs of Carnarvon Bay, and known as the Welsh grey granite, is now the favourite stone in the market; it does not polish in wear, and its durability seems to surpass all other stone yet discovered.

A report furnished by the borough engineer of Bradford to the Town Council shows that on an area of 7000 superficial yards the first life, as he calls it, of the various paving stone used in that town are Yorkshire set 8, Random granite 10, Shap granite 9, Welsh granite 40, Dalbeattie 18, and Mountsorrel 25 years. Cost per yard respectively—4s. 11d., 5s., 9s. 6d., 11s., 10s. 6d., and 12s. Total cost, including interest upon first outlay at end of 25 years—Shap granite, 19,953*l.* 10s.; Yorkshire sett, 12,687*l.*; Random granite, 10,640*l.*; Dalbeattie, 9666*l.* 16s. 1d.; Mountsorrel, 8974*l.*; Welsh granite, 8232*l.* It will thus be seen that the Welsh granite is not only considerably cheaper according to the above scale, but seem to have still 15 years of life to run. This gentleman goes on to show that granite paving is preferable to Yorkshire, both in regard to economy and tractive force, and especially in a sanitary point of view, also as to foothold for horses. The subject of asphalte or wood pavement seems not to be of sufficient importance to be thought worthy of consideration, at least no comparison is made. According, however, to the report of Mr. George M Van Nort, Commissioner of Works of the City of New York, that city seems not only to have given wood pavement a thorough trial, but to have paid dearly for their experience. He states in a report in February, 1873, respecting the relative slipperiness, "I have to say it compares unfavourably with stone pavement, and is about equal to concrete pavements. In addition to the above I would say that wood pavements are especially objectionable where the drainage is insufficient, or the ground naturally damp," and that his experience is that in thoroughfares subject to heavy traffic the best of wooden pavements are almost useless. He further states, "Assuming that no more wooden pavement will be laid in this city, it is estimated that at least 80,000 yards of renewal will be required in each year to maintain the present quantity, and if that is done with patent material at the present price of $4 per yard, it will entail an annual expense of $320,030 for 18 and 3-10ths miles of streets, or an average of $17,486 per mile per year, while the repairs of stone pavements in 290 miles of streets have cost but $150,000, or an average of $517 per mile per year." He further states that since decay has taken place in the wooden pavement very many complaints have been made of the offensive effluvia emitted from it, and also of its being unfit to travel over.

From the foregoing reports it would seem that there must be a bright future in store for the Welsh granite quarries. The principal quarries now in operation are the Welsh Granite, Port Nant, Nevin, Pystill, Carnarvon Bay, and the Cambrian, but other valuable properties are about to be started, known as the North Wales Granite Quarries. These are just opposite the works of the Welsh Granite Company (Limited), having identically the same stone, and an unlimited quantity, with at least equal facilities for quarrying and shipping. This property, which sooner or later must become, if properly developed, one of the most extensive and profitable in the Principality, belongs solely to Mr. Spargo, of Bangor. There are two adjoining sites (Tan y-Graig and Aberaven), belonging to Sir Llewellyn Turner and Mr. Spargo, which are also about to be worked. These are all in proximity to the famous Welsh Granite Quarries. The Tan-y-Graig and the Aberaven, however, produce a darker coloured (but it is considered of equal value) stone to that of the Welsh Granite Company's and that of Mr. Spargo's. About 3000 tons have already been shipped from the latter previous to its being acquired by that gentleman.

The next district is that of Port Nant; here, also (except the quarries now in operation), the entire coast where workable sites and suitable rock are found, for about 1½ mile, is secured by Sir Llewellyn Turner and Mr. Spargo. The rock here actually abuts on the sea, and ledges branch for 500 ft. in height, therefore the operations will be carried on at an unusually small cost, as no inclines will be required as in the adjoining quarries. Thus considerable outlay will be saved, and the cost of putting the stone f.o.b. reduced to a minimum. About 1½ mile towards Nevin are the Pystill and Nevin Granite Quarries, both valuable properties, and will shortly become very profitable. The latter is worked by a London company, Mr. C. J. Fox, of Cornhill, being the principal proprietor. The various quarries in these districts furnish to the British capitalist a highly safe and permanently profitable channel for investment. Some of these quarries are reported to be paying from 15,000*l.* to 20,000*l.* a-year, which are being augmented yearly as the operations extend. Several in the hands of Mr. Spargo should be made equally valuable in a comparatively short time if vigorously worked. ——— QUARRY PROPRIETOR.

NEW CONTRIVANCE FOR MAKING ROADWAYS AND FOOTPATHS.

SIR,—In last week's Journal I addressed you on the subject of "Horse Shoes *v.* Asphalte and Wood Pavements," and in doing so took occasion to remark that material for really solid, smooth, and clean pavements was a desideratum. The present are inefficient, dangerous, and costly. The first expense in laying down asphalte or wood is very great; but it does not stop there, so easily are they put out of repair by ruts from the fall of heavy articles, such as iron machinery, timber, &c., and so liable are they to damage from brewers' drays, timber wagons, fire-engines, Pickford's carts, and the like that they are constantly under process of repair, incurring the expense, and impeding traffic. Regent-street has recently been in an almost impassible condition. The macadamite roadway was supposed to be strengthened by a concrete of asphalte, but the traffic, especially by the omnibusses, broke and raised it, and the work of relaying has gone on tardily, with material which is not likely to be more lasting.

Under these circumstances it is well to learn that a substance has been discovered which ought to supersede—and probably will supersede—both wood and asphalte roads, or any combination of them which is now resorted to. Particulars may be learned from Mr. Taylor, 447, Strand (West), and applications made to him. The process is to lay down MacAdam with a cohesive preparation, which will perfectly fasten and hold the material of the road, so that it will not break up with any ordinary weight usual to our traffic, sustaining the heaviest vehicles. Nor will it rise, as is the case with materials now used, in frost, nor will it be permeated by rain which will flow from the skilfully adjusted surface.

The expense of this system is inconsiderable, probably not a fourth of what is usual now with the other pavements, putting out of view the fact that it will not require to be re-laid one-tenth as often. Of what the cohesive consists cannot, of course, be disclosed—that is the secret of the patentee, but that it is thoroughly adequate to constitute safe, durable and clean roads is evident from the experiments already made, as well as from a competent examination of the substance itself. It has been tried in Sheffield and other parts of Yorkshire, and has proved to be an eminent success. It is extremely probable that it will be laid wherever the existing pavements need to be taken up throughout Yorkshire. It is much to be desired that London would follow the example. It is, however, not only applicable to our highways but our bye-ways. Asphalte is now used on many of our footpaths in the streets of the Metropolis, but generally flags are preferred. Perhaps the cinder footpaths in Manchester make a smoother path; but they are dirty, soiling the skirts of ladies' dresses and other garments, sometimes irreparably. Now, in our very best laid London flag-ways there are numerous hollows formed by wear and weather, which are so filled with rain that the road is often preferable to foot passengers. The new cohesive can be applied to footways at one-third the expense of Yorkshire flags, and will much seldomer need repair. For gardens, parks, and pathways across fields, and connecting suburbs, the new system is indisputably preferable to all others. Frequently in the parks footways are laid with flint to the destruction of boots, especially those of ladies and children. The new plan averts this, and affords a safe footing, without slipperiness and dirt, and is as pleasant to walk upon as is the green turf in fine weather.

Why not the Board of Works try it where they have the power? The flower-walk in Kensington Gardens, and the broad paths between the Marble Arch and Hyde Park Corner, would give excellent opportunity for experiment, as they are at present sloppy and broken, and the public much require their use. If Londoners be as slow to adopt a novelty as our critics allege, let us for once refute the criticism, and have a new way. ED. H. NOLAN, Ph.D., LL.D.

City, Nov. 21. ———

ELECTRIC LIGHTING.

SIR,—Before progressing with my subject, permit me to call your attention to an error which occurred in the printing of my letter of last week. You make me say—"Placed far, so to say, between France and England;" when it should have been—"Placed for, so to say," &c. This error may have no other consequence beyond this, that perhaps some of readers may have thought that, writing on electricity, I desired to be supposed sending my letters from some cloudy regions overhanging the British Channel, or that, like another "Jules Verne," I had gone for five weeks in a balloon, and had a pigeon as postman.

IV. LOADING AND UNLOADING VESSELS.—There is no possibility, of course, to propose that every vessel should be provided with a magneto electric apparatus; but if steamers only were provided each with it the owners or charterers would find its employ of great advantages. With one apparatus on board one focus of light can be placed in the hold, one on deck, and one on the quay, and by such an arrangement loading or unloading could proceed by night as well as in daytime. There is no use, of course, to point out the many advantages that such a plan would give. Already several steamers have electric light on board for their head and side lights.

V. MEN-OF-WAR.—On board men-of-war the electric light can be made use of for many duties, as, for example—to light the powder magazines through transparent walls or divisions; to facilitate the discovery with a night-lamp *ad hoc*, which only reflects its light on the object sought for of the neighbouring shores or of the enemy's ships; to help the gunners to direct their shots; to transmit under quite new conditions of distance, quickness, and safety the signals according to the rules or navigation, or according to convention; to obviate the inconvenience and danger arising from the extinction of coast lighthouses; to help the bombarding of ports or of an enemy's vessels; to facilitate a landing at night, and to see without being seen. This resists wind, rain, and the most violent commotions. The first trials of this system of lighting on board ship took place on the Prince Jerome, the Invincible, the Heroine, of the French Navy, and on board the Amerique of the Compagnie Transatlantic. Entire success was the result.

The Emperor of Austria went to the opening of the Suez Canal on

its yacht thus lighted. The Government of Brazil adopted it for the Javary. The Emperor of Brazil, when lately in Paris, warmly complimented the engineer who had fitted the apparatus, Mr. Van Malderen.

VI. By Salvage Corps.—It very often happens that the position of a vessel in distress cannot be exactly ascertained. With the use of the electric light, however, the detection of a vessel in danger would be comparatively easy by means of the marine lamp. Submarine researches also would be greatly facilitated by the use of electric light. This light, being completely independent of oxygen, can be easily enclosed in a water-tight lantern, and sent down to the bottom of the water. It could have been used with advantage in ascertaining the exact position of the unfortunate Vanguard, for example. For coral and pearl fishing, too, its use would be of great avail.

VII. Mines.—The lighting of mines, and especially collieries, being the special subject of these letters, I shall reserve them for the last.

VIII. Large Buildings or other Undertakings.—The electric system of lighting is of immense advantage when works of that kind have to be carried on by night, the light being as bright as daylight. The piercing of the Buttes des Moulins, for making the Avenue du Grande Opéra, in Paris, has been continued uninterruptedly from beginning to end by the help of this light. The immense operations now being executed by Mr. Jeunne Deslandes, at the Harbour of Havre, are also carried out over-night by means of the electric light. By its help, Mr. Deslandes takes advantage of the night low tides for erecting the brickworks, driving in piles, digging foundations, &c., which are under water at high tides. At 500 yards from the light workmen can be seen busily fulfilling their various duties without any difficulty, and a newspaper can there easily be read.

A. Vassard.

Old Vicarage House, Greenwich, Nov. 22.

[To be continued.]

THE NEW QUEBRADA, AND THE BOLIVAR RAILWAY COMPANY.

[Continued from last week's Journal.]

Sir,—In one of my letters I referred briefly to the subject of the amalgamation with the Bolivar Railway Company, and as very little is known of the traffic that the railway is likely to meet with, apart from the contract with the New Quebrada Company, I have taken some trouble to obtain an estimate that may be said to have reliable data for its basis. Many of your readers are aware that some years ago a railway, called the Central Railway of Venezeula, was projected from Puerto Cabello to San Felipe. A company was formed for the construction of this line, and was promised a guarantee of 9 per cent. by the Venezuelan Government. This guarantee was actually paid for a short time; but, ceasing together with the interest on the loans raised in the London market, the company collapsed, and the few miles of railway completed, together with the rolling stock and other materials, were abandoned. San Felipe and Barquisimeto—the two most important towns of the western province of Venezuela, are more easily accessible from Palma Sola, a station about midway between Tucacas and the Mines of Aroa, than they are from Puerto Cabello by the route chosen by the defunct company; it is, therefore, reasonable to suppose that the Bolivar Railway can, if its owners choose, carry the traffic for the working of which the Government once offered a guarantee of 9 per cent.

The following extract, from a pamphlet published in Valencia, the capital of the Province of Carabobo, in Venezuela, in 1858, gives an estimate of the traffic then expected; and, as the trade of the country has not declined of late years, it may be accepted as fairly representing the traffic which the Bolivar Railway Company may meet with at the present day.

Extract from a pamphlet published in Valencia, in Venezuela, in 1858, entitled the Central Railway Company of Venezuela to the Public:—

At present the only means of communication between Puerto Cabello and San Felipe is a track for animals, which, almost impassable for six months of the year, may in reality be considered so all the year round, on account of the great difficulties which exist for the transport of the cargoes.

The ordinary rate of freight is 3 pesos (9s. 3d.) for 100 lbs., and three days at least are occupied from one point to the other. In this state of things it cannot be doubtful that, if any kind of transport be provided which shall reduce the freight to one-third or even one-half, and the time to a small fraction of that now taken, the time to be the same in winter as in summer, the enterprise that shall make such improvements must secure all the business done between the two points.

From the provinces of Barquisimeto and Yaracuy there will be—

Coffee, from the Canton of Nirgua	Cwts.	30,000
,, San Felipe, Sucre, Urachiche, Yaritaqua, Cabudare, and Barquisimeto		100,000
Cocoa, from the same Cantons		16,000
Indigo, ,,		2,000
Cotton, ,,		2,000
Hides, ,,		20,000
Return goods, in exchange for the above productions, in dry goods, general stores, salt, machinery, &c.		80,000
Total		250,000

The freight of these goods is calculated at one-third part of the present cost—viz. at 8 reals per cwt. (3s. 1d.), and will realise 250,000 pesos.

There are other products which at present cannot be sent to market in Puerto Cabello for the excessive cost of transport in comparison with their value; but, if the freight be reduced, the following quantities can be counted upon—

Sugar, tobacco, grain, copper, and other minerals	Cwts.	150,000
Dye woods, timber for construction, furniture woods, &c.	Tons	5,000

Putting the first products at 4 reals (1s. 6½d.) per cwt. and the second at 4 pesos (3l. 4l.) per ton, in order to make sure of the present production, and to stimulate its increase, we shall have—

Sugar, tobacco, &c., 150,000 cwts., at 4 reals	75,000	pesos.
Woods of various kinds, 5000 tons, at 4 pesos	20,000	,,
Animals, fruits, vegetables, &c., 5000 tons, at 4 pesos	20,000	,,

Passengers.—Although the principal object of the railway is the carriage of merchandise, yet it will not be impossible to calculate the return which the passenger traffic may yield. The population directly influenced by the railway amounts to 50,000 souls, and that influenced in greater or lesser scale by its relations with Puerto Cabello reaches to 61,000,—so that we may calculate upon 80,000 inhabitants. From this we may suppose that there will be—

First-class passengers	20,000 annually,	at 5 pesos.
Second-class ditto	30,000 ditto,	at 3 pesos.

RECAPITULATION.

Principal fruits of exportation, and imported merchandise	250,000	pesos.
Sugar, tobacco, grain, copper, &c.	75,000	,,
Woods of various kinds	20,000	,,
Animals, fruits, vegetables, &c.	20,000	,,
Passenger traffic	190,000	,,
Total annual gross receipts	555,000	,,

Equal to £86,000.

San Felipe is, I believe, about 30 miles distant from Palma Sola; but the merchants of the interior will bring their goods to Palma Sola if the freights asked from thence to Puerto Cabello do not exceed those given in the extract quoted, rather than undertake the journey by the coast road. But let us suppose that only half the estimated traffic be carried by the Bolivar Railway, and we shall have a gross total traffic of 43,000*l.* per annum. Deduct from this working expenses at 60 per cent., more than sufficient in a country where fuel is available in any quantity on either side of the line, and we have 17,200*l.* left as profit, or about 5 per cent. on the capital of the Bolivar Railway Company—surely not a bad addition to the profits to be earned under the contract with the New Quebrada Company.

A correspondent of the Money Market Review, of Sept. 8, published a translation of a letter extracted from a newspaper current in Venezuela, from which it appears that the Bolivar Railway Company charge 5 pesos—or, say, 15s. 6d.—for carriage of a cargo of goods from Tucasas to Aroa. Taking the cargo at 2 cwts., we see that the cost from San Filipe to Puerto Cabello was estimated at 2 pesos, or 6s. 2d., by the Central Railway route. This comparison seems to justify the Venezulan's belief that the Bolivar Railway Company does not seek to attract and develope the local traffic, but that the railway has been built solely for the purposes of the Aroa Mines.

The results of this year's operations at the mines, the completion of the railway and the forecast we may make of the future, give, I think, data whereby can be estimated with a moderate degree of accuracy the results likely to be obtained if the two companies are united as one concern under one management. The advantages to be reaped from amalgamation were so well shown by Mr. Darlington, at page 19 of his report, that it would be superfluous to repeat them. I will, therefore, submit my estimate of the probable results to be obtained from working the two concerns together. In estimating the profit upon working the mines I have only taken the ruby ore into account, as I consider that the yellow pyrites should not be raised until smelting-works are established. The question of poor ores can, therefore, be considered by itself hereafter, when further experience of a reducing process is obtained. There is, I think, no reason why the minimum quantity of 20,000 tons yearly should not be raised in ruby ore alone, and allowing that the percentage does not pass an average of 12 per cent., and reducing the sale price at market as low as 10s. per unit, I estimate that a profit of 2*l.* 10s. per ton should be made; but to realise this the railway freight must be lowered from 1s. 6d. per ton per mile to about 2d.—its proper cost. Then estimating—

Ruby ore	Tons 20,000, at	£2 10s.	... Profit,	£50,000
Timber	12,000,	2 0s.	... ,,	24,000
Railway local traffic				17,200
There is a gross yearly profit of				£91,200

Sufficient to pay the interest and sinking funds on the debenture capital of both concerns, and leave 6¾ per cent. on the united share capital.

The consistency with which I have for many years upheld the value of the Aroa Mines and of the 750,000 acres of land known as the Bolivar estate, of which one-third is owned by the New Quebrada Company, as well as the prospects of trade generally in the district, must be my excuse for troubling you with such a lengthy communication. Eight years ago, when I was connected with the New Quebrada Company, the capital involved was, I think, about 250,000*l.*, and I believe that 200,000*l.* additional capital would have finished our railway to the mines. The capital of the two companies now involved amounts to upwards of 1,000,000*l.* sterling; but the property is such a rich one that it will, with proper management, bear this enormous capital, and return dividends that will be fairly remunerative to the proprietors. There are many other sources of revenue that might have been named, but I have preferred to rely upon three known and proved ones only.

F. D. Mathews,
Assoc. Inst. C.E.

Mildmay Chambers, Nov. 15.

PACIFIC COAST NOTES—EASTERN NEVADA.

A GLANCE AT EUREKA. THE RICHMOND, AND ITS MANAGEMENT. EXEMPLARY CONDUCT OF ITS CHIEF OFFICERS, MESSRS. PROBERT AND RICKARD.

Sir,—It is long since I employed my pen on behalf of the Journal that in now again addressing it I feel as though I was making overtures for a renewal of the friendly relations which had previously existed between myself and some old and valued friend, whose memory time and its cares had failed to obliterate. But though my silence has been somewhat protracted, I am still hopeful that past associations will help to secure me, as of old, a corner in so widely disseminated a paper as the *Mining Journal*.

If memory is not deceptive, my last communication to it was penciled amidst the sombre overshadowing of Mount Davidson, which, like some giant sentinel of legendary lore, keeps watch and ward over the almost illimitable wealth of the great vinous artery which course spolarwards beneath its rugged base, so to the esthetical tourist visiting the Comstock, the landscape presented is anything but beautiful, but if lacking in the essentials of elegance, loveliness, and diversity which characterise the scenery of more favoured climes, it has at least the merit of possessing a wild, bold, picturesque mountain grandeur not often met with even in the most mountainous and deeply corrugated sections of the battle-born state, as picturesque editors and reporters sometimes love to designate Nevada. The Comstock is a wonderful lode, wonderful in not only its yield, but also in its structure and geological and mineralogical attributes. To the man of science it is a mine of wealth in more senses than one. This is especially true of it in this epoch of its career, when public interest is again revived in its wonderful resources and in its apparently limitless wealth of the noble metals, the discovery of which in 1860 culminated, a few years later, in the formation of a sovereign State, and in attracting hither from not only every section of the Union but also from the remotest corners of the Old World an intelligent and enterprising population, such as no reverses of fortune could entirely dishearten.

But to our "muttons" and the main purposes of this letter, without further preface. What a lamentable mistake men of otherwise good judgment and sound business views sometimes make in relation to subternary matters. Although I had always held to the belief that the output of not only Ruby Hill, but also of Prospect Mountain, and, indeed, of the whole of the mineral-bearing portions of Eureka mining district, would in time when greater depth and more extensive internal and external explorations had marked the course of developments place Eureka district in the front rank of the base bullion-producing regions of the world, I little dreamt three years ago when I bid a temporary farewell to the Bose Range that I should when I again returned behold the wonderful changes which have been wrought in my absence. Had the lamp of Aladdin been called into requisition the surprising metamorphoses which have been effected in surface configurations, the extent and value of the mines, and in the architectural adornments of the town, could scarcely have been more thoroughly accomplished. On every side are to be seen improvements of an elegant and even substantial character. Business men, too, are no longer downcast, but quite buoyant and hopeful, as well they ought to be, for the future of their town looks bright and radiant, and the promises put forth portend something more cheering than ruined credits and bankrupt fortunes. To many of those men the Fates have been most generous, for in the past few years they have been gently touched by the subtle wand of Mistress Fortune, while others who have been either less thrifty or less fortunate still hang between hope and fear, or, like Mahomet's coffin, suspended, as it were, between heaven and earth, while they still continue to woo the fickle goddess, and to look forward to the good time when she shall make them due reparation for her long neglect by placing them firmly upon the pedestal of all their dearest hopes and aspirations. The town, whose population I place at 4000, district 6000, is distinguished for its extent, its growing importance, and for the many handsome and commodious business and private structures, which impart an air of both elegance and uniformity to its leading thoroughfares. And these outward evidences of substantial prosperity are not, as might be supposed by distant readers, altogether confined to the town of Eureka. They are visible everywhere throughout the district, but they mostly occur in the vicinity of the leading mines, such as Ruby Hill, where the foundations of embryo cities have been already laid, almost as broad and deep as are the foundations of the great industry which is the stay and backbone of the region we inhabit. We observe them in the costly buildings which shelter the splendid shafts and expensive hoisting works which form a not unattractive feature of the landscape of both Ruby Hill and the neighbouring localities. We also behold them in the many elegant improvements in the buildings, the tramways, the wagon roads, and in the bands of iron which connect the mines with the furnaces. We see them in the motions and snortings of the iron steed as he swiftly climbs over the steep graded hills, which erst while resounded but to the lash and to the deep toned voice of the ore teamsters as they ever and anon urged their slow-paced animals forward. The material wealth of this section of Nevada is all but illimitable, and if anyone doubts it let him or her but visit the mines and reduction works of Eureka, and I warrant the transition from scepticism to full belief will be both quick and lasting. But an inspection of the Richmond Works, both refining and reduction, will prove of the greatest interest to the visitor who loves to witness the extensive and complicated metallurgical operations that are daily carried on there. He can also feast his eyes on the huge piles of glittering bullion which await shipment from this highly favoured district to the two great metallic emporiums of the American Continent—New York and San Francisco—and in looking round he cannot fail to be impressed with not only the value, but also with the gigantic proportions of the charcoal already binned for winter use. But when he is told that carboniferous mountain is soon to be enlarged by an addition of 200,000 bushels more, the contract for which has been recently let, his wonder grows apace, and increases at each step as he listens to the busy continuous hum of the operatives, whose every movement contributes to the well-being of the most prosperous, and now best managed, English company operating on this coast—the Richmond. It has at this writing three out of its five furnaces in full blast, with the prospect of having another soon added, an addition which would place it on a footing with its late antagonist, the Eureka Consolidated, whose four cupolas are now employed in the make of bullion, of which there have been 41⅔ tons per day produced during the month just passed. This gives an aggregate product of a fraction over 1291 tons, which at an average of $280 per ton, and I have been informed that this is low average, gives a money value of $361,480. Deducting the usual monthly dividend of $3 per share from this aggregate, we have left the comfortable balance of $211,480 wherewith to pay current expenses and augment the fund laid by to meet (say) future exigencies that might arise. The three furnaces of the Richmond turn out, I have been informed, an average of 34 tons per day, which, at the usual maximum value of $300 per ton, and probably more, for the Richmond ore has, I believe, always borne a larger proportion of gold and silver than has the one of the former company, exhibits a coin value of $10,200 per day, or a total of $306,000 a month of 30 days. This amount may be somewhat above the present yield, but if it is the difference between itself and the actual figures is so small that it is scarcely worth the noticing.

Taking the actual current yield of the two companies here given as a basis upon which to rear hypothetical figures, we shall have very little trouble in showing that, provided the works of both companies continued without interruption to run for ten months as now running, allowing the two remaining months for repairing, relining, &c., each employing the number of furnaces it has now in use, we should have the following returns:—Richmond, ten months, three furnaces, $3,060,000; Eureka Consolidated, ten months, four furnaces, $4,614,800; or a united annual gross yield of nearly $7,000,000. Need more be said? Scarcely; for this showing is unparalleled in the annals of base metal mining, either here or elsewhere. Eureka district has already, probably, added $4,000,000 to the circulating medium of the world since the opening of its mines, and I now venture the prediction that, provided no mishap befol them, they will, inside of the next decade, produce above $100,000,000 more.

The Richmond is now on the high road to prosperity, and if I would be just I must say that much of the success that has lately overtaken it is in a great measure attributable to the vigilance, ability, and practical mind of the managing director and his able superintendent, Mr. Rickard. At one time during the early incumbency of Mr. Probert I sharply criticised his managerial acts. But though I then questioned the soundness of his policy I am now not ungenerous enough to withhold from him the encomiums to which, as the manager of a great corporation, his unswerving integrity justly entitles him. To deprive both himself and Mr. Rickard of the credit they have earned for bringing both the mine and the works to their present high standard of excellence would be doing them a manifest injury; therefore, in whatever light these laudatory remarks may be viewed by Transatlantic soreheads who continually harp in dolorous strains upon the millworn string of mismanagement, &c., I cannot now refrain from "Rendering to Cæsar the things that are Cæsar's." That I criticised Mr. Probert's acts at one period is true, but that I criticised in no mean spirit is also true. I simply took exception to his administrative acts at a time when I deemed it necessary, the same as I would have taken to those of any other public functionary, be his position what it might. The manager of a great mining corporation is no less a public man than the aspiring politician who, having attained his ambitious aims by securing office, after awhile abuses the confidence reposed in him by his fellow-citizens. The only difference between the two is that the former, in case of maladministration or malfeasance in office, is amenable but to a few; whereas the latter if found guilty of like offences becomes amenable both to the laws and to the censure of a wide spread constituency.

The great trouble with Mr. Probert, whose transcendent abilities remains unquestioned, was that he had tried to accomplish too much. Too much zeal is sometimes as bad as none at all. I am now, however, fully persuaded that if the gentleman just named had had the experience of American public life which it is presumably he now possesses, he would have committed fewer errors of judgment than at the time marked his management. He should have remembered the lines—"I dare do all that man can do—who dares do more is no man." The best and wisest of men will sometimes err, and Mr. Probert's errors probably arose from an ambitious desire to perform more than, under the circumstances, it was possible to successfully accomplish.

We will now pass to another topic of perhaps greater interest to your readers—the condition of the mine, of which my present space will not allow me to say more than that it is in a high state of development, and that its ore reserves are simply grand, and their value and proportions enormous. It is well managed, and judiciously worked under the direction of superintendent Rickard, than whom there are few more practical, unassuming, courteous gentlemen and efficient officers to be found within the broad compass of Nevada. He is very popular with the employees of the company, and I must also note that he is deservedly held in high estimation by our leading business men. He is very popular with all classes, and my own observations enable me to say that he is an experienced miner and smelter, two branches of industry which requires to be well understood by a superintendent who would render them profitable to his company. I also had something to say of this gentleman's management of the mine in a previous letter more than a year ago, and if I then condemned I am generous enough to say that the best and highest compliment which I can pay Mr. Rickard is that he is efficient, careful, and attentive to his duties, the company's interest faithfully guarded, and the minutest, as well as the largest, details of his onerous position daily receiving his undivided attention and direction. Having now, I think, rendered exact justice to all concerned, I must apologise for the great length of this desultory letter, which I purpose supplementing by others of less voluminous proportions.—*Eureka, Nevada, Nov.* 1.

J. D. Power.

FLAGSTAFF MINING COMPANY.

Sir,—I arrived in London from Salt Lake City three days ago, and had my attention almost immediately called to a paragraph which appeared in the Journal of Nov. 3, which was to the effect that developments of rich ore of great importance had recently taken place in the Flagstaff Mine, and that such discoveries might represent "a million of dollars," the property being, in the opinion of your correspondent, perhaps doubled in value. It may be of some interest to you (inasmuch as certain parties, most likely Bears—as I am given to understand—have endeavoured to prevent your announcement having its full and deserved effect) to know what, as a practical mining man, my views of the value and importance of the discoveries you allude to are. Though (while about three weeks ago on the spot) I did not enter the mine, yet I did myself see ore of a greatly improved and very superior description being sent up from the westerly extensions of the 3rd and 5th levels. From the last-named levels large quantities of soft powdery light brown or buff coloured argentiferous carbonate were coming to surface. It was, however, from the first named level, or 3rd, that ores of an unusually important and remunerative kind were being taken. They consisted almost wholly of rich yellow carbonates intermingled with solid glittering masses of silver-lead. I may say that I have had a great deal to do in a practical way with silver ores in the western portions of America as well as in Mexico, but in no country have I ever seen ore that spoke more favourably for the future of any mine.

The bright yellow carbonate ore is worth generally about 18*l.* per ton, and in the special case of the Flagstaff the carriage of the mineral being down grade all the way the ore ought to be mixed and marketed at a cost not exceeding 4*l.* 10s. per ton. This would afford a very large margin of profit, and with the excellent management the company appears to have at the mine now, I think the shareholders should feel very hopeful. The bright yellow carbonate

ore, such as that now coming from the end of the 3rd level, of which I make special mention, is always most remunerative mineral. It is so, firstly, from its extreme ease of mining; secondly, from its ready and inexpensive treatment in the furnace; and thirdly, from its uniform richness in silver.

I can state from personal observation and knowledge of both ores that the bright rich carbonite now being taken from the No. 3 level of the Flagstaff is identical with the great carbonite mass of the Emma Mine (which property is somewhat lower down the hill, but on the same vein), and from which ore to the value of over a million and a half sterling has been realised. You intimate that the value of the mine is, perhaps, double. I do not know at what figures the property has hitherto been held, but this I am convinced of, that with the present rich and powerful discoveries—occurring where they do, out nearly 1000 ft. from the working shaft—that the property is now, in my own estimation, rendered equal in value to any three of the best silver mines in Utah, and the territory posesses some very good ones. With the excellent and high-toned supervision of Messrs. Billing and Beatty, the Flagstaff is now rapidly merging into a great success. The mine evidently posses all the richness of the Emma product, but, unlike that well-known local bonanza, has given the most ample proofs of being a permanent, powerful, and prolific lode. As one who is strongly desirous that the few American mines invested in by English capitalists should have a fair chance, I have been prompted to trouble you at far greater length than I first intended. CHAS. HARRIS PHELPS.

Sydenham, Nov. 22.

FLAGSTAFF MINING COMPANY.

SIR,—By private letters received by me this week from Utah, I am pleased to find that your announcement of a great discovery of rich silver carbonate ore in the westerly portion of the Flagstaff is completely borne out. I desire especially to thank you for your timely announcement, for I am convinced that but for publication of the fact we shareholders would have still been in the dark as to the important discovery; for, notwithstanding your publication of it, we had to wait a fortnight for any official notice of the same from the board (which intelligence seemed to be so necessary), and when we did get the notice it was—seemingly for some purpose—hampered and crippled by a confusing and worse than useless telegram. And I understand this telegram was obtained in reply to one that was sent after Mr. Beatty's letter, confirming the good tidings of your notice, had been received. Such conduct as this needs explanation; but will we ever get it? I am delighted to hear that two such gentlemen as Mr. Wild and Mr. Garne have come upon the board, for I feel confident that we shall not have to complain of such unseemly operations hereafter.

Nov. 21. AN INCENSED SHAREHOLDER.

NEW QUEBRADA COMPANY.

SIR,—I quite endorse the observations contained in Mr. Mathews's able letter in last week's Journal, and am confident that some such steps will speedily have to be adopted. I trust that the rumour that an eminent firm of mining engineers were about to take the management of the mines may prove correct, as it is simply a question of sound practical management that is required to make the Quebreda's Company's name stand as high on the list as any of the copper mines ever placed on the market. Having taken much trouble to ascertain the cause of the shipments of the low-class ores which have been sold at Swansea, I am satisfied that it is only attributable to mismanagement at Tucacas, and I trust that if any arrangement should be arrived at with the firm referred to, that the gentleman now holding the joint post of general manager to both the mining and the railway companies will not be permitted to interfere with the practical development of the mining operations; but at the same time I would strongly advise that Mr. Francis should be retained in the position he now occupies, as from all quarters I hear him spoken of in the highest terms, but unfortunately, heretofore he appears to have been hampered by theoretical superiors, from what I can ascertain, and this has caused the ruin of many a good mine, and will prove the same with the Quebrada Company's property if allowed to continue.

City Chambers, Nov. 23. PRACTICAL MANAGEMENT.

NEW QUEBRADA MINING COMPANY.

SIR,—I have read with much pleasure and thankfully the letter of "An Old Shareholder" in last week's Journal. His information and warning are to me all the more acceptable now that I have fully verified his more important statements and intimations; for this week I have personally received a private letter from the Quebrada Mines, under date of the 27th ultimo, giving particulars of a most important ore discovery recently made. In driving one of the upper levels into entirely new ground—to the northward of the old Carthew workings—a large and very valuable lode of high-class ruby ore, much of it giving 40 per cent. of copper, was opened up, the average of the entire lode being estimated at 30 per cent. Another level was being driven still higher up the mountain with full expectation of cutting the same magnificent body of ore at this greater elevation, it being now well ascertained, it appears, that the richer oxides and carbonates abound in great strength above the water line of the lode. This latter fact I regard as very important, having in view that above these two new upper levels now being driven there will be, as my correspondent assures me, nearly 1000 ft. of backs or stoping before working up to the surface.

In the second level some rich malachite and almost pure red oxide ore have already been cut; independently of these new discoveries a large quantity (several thousand tons) of ruby ore has been broken down for some time in one of the comparatively lower levels, but which has not been available for shipment owing to there being no proper or sufficient means for getting it down (from where it is piled in the upper workings) to the level of the ore floors. An oblique "shute," my correspondent says, is being cut directly to this ore pile, and is in the moment of completion, so that we may expect—judging from what he says—to be continuously receiving Quebrada ore of a satisfactorily remunerative description hereafter. As to what "An Old Shareholder" says about a scheme being on foot for co-operation between the firm who built the Bolivar Railway and a well-known mining house of high position, that also is quite correct. But perhaps I may tell "An Old Shareholder" that the scheme is one of more magnitude and import to the Quebrada shareholders than, perhaps, even he is aware; for I can assure him, and as a shareholder I am truly glad I can speak confidently, that the arrangement (which has been substantially settled during this week) is a sort of tripartite union with the co-operation of the New Quebrada directors, in which a well-known smelting firm of the highest standing becomes also a part, which, it is understood, proffers a large amount of working capital for developing the mines, in lieu of an undertaking that all the Quebrada ores shall hereafter be sent to their establishment for reduction. With this new addition to the arrangement, the scheme becomes one of the utmost moment to the New Quebrada Company; for with the combination thus completed the mines, all three of them, are assured, and without loss of time, a most extensive development and working; and, as to the results that may be expected, the mail just arrived brings intelligence of not only an assuring but of a most conclusive character. My correspondent states that all in authority at the mines are perfectly satisfied that there is more 30 per cent. ore entirely above the limits of the yellow pyrites than could be worked out, to use his own words, "during the next hundred years." He further states that the manager at the mine was writing to the Quebrada directors respecting the rich discovery which had been made, and no doubt they will bear out the trustworthiness of all I am saying in case enquiries be made of them. Meanwhile, I am satisfied that the dawn of a bright day for the long-suffering Quebrada Company is at length realised.

A most proper, business-like, and efficient consummation is effected. One great firm has built the railway for carrying the ore, another firm of distinction and eminence in the line of practical mining has undertaken to develope the property and procure the ore for the railway, while another prominent house, whose success in the reduction of minerals is known the world over, has undertaken to smelt the New Quebrada ores when they come to hand. So perfect, proper, and powerful a combination for working out a great mining enterprise was never, perhaps, before attempted, and and the total effect of so salutary a scheme—entered into by such parties—cannot fail to prove an immediate good to both the Bolivar and New Quebrada Companies.

Croydon, Nov. 21. A LARGE QUEBRADA SHAREHOLDER.

JAVALI MINE.

SIR,—You favoured me a few weeks since by inserting a note from me, since then another monthly report has been received which greatly exceeds the promises made in the sub-manager's former letter to which I alluded. There has been more quartz crushed, and the yield is much better; the profit being about 700*l.*—75 per cent. The amalgam obtained from the tailing mill is difficult to treat out there, but will be forwarded to this country for separation. Allow me to suggest, through the Journal, to my fellow-shareholders that they would do well to call at the office and read the monthly letter, it is open to all shareholders. We have gentlemen for directors who keep nothing back from us. I am happy to add that we may expect still better results from the October working. B.

Nov. 20.

PRICE OF TIN.

SIR,—The recession in the price of tin has justified my suspicion that it would recede. I expressed my belief that those persons who purchased shares so freely at advanced prices would have cause to repent of their bargains, which, no doubt, they now do. S.

Nov. 20.

LLANRWST LEAD MINE.

SIR,—I read in a certain circular forwarded to me a few days since that this mine is to pay a dividend next month. It would be gratifying if the chairman, directors, or secretary would inform the shareholders how that dividend is to be paid, and out of what it is to be paid? I see that at last 50 tons of ore have been sold at a very fair price—12*l.* 5*s.* per ton—and that 70 tons are to be sold next month. Presuming the 70 tons fetch the same price per ton, the proceeds of the two sales will not realise sufficient to give 1*s.* per share, there being 30,000 shares in the company. If, then, a 1*s.* dividend is declared, to make up the required amount—1500*l.*—a portion of the capital of the company, it would seem, must be encroached upon. Considering that to produce these two sales of ore it has taken some four years, and an outlay of some thousands of pounds, would it not be more judicious on the part of the directors to place the money in the bank—that is, if the company have a banking account, of which I am not certain, unless a shareholder (not a director or a secretary) is the banker to the company, and if such is the case would it not be well to know if and what guarantee or security the directors hold for the money so held, and, if the directors do hold any and a sufficient security, where such is deposited? Perhaps the chairman or secretary will, through the medium of the Journal, answer these very important questions. A SHAREHOLDER.

Nov. 22.

VALE OF CONWAY MINING COMPANY.

SIR,—Business having taken me this week to the neighbourhood of Llanrwst, and having read the reports in the *Mining Journal* of the mines in this district, I decided to go and see for myself, and gain all the information I could on the spot. My intention was to go first to the Llanrwst Mine, and then to the others in rotation; but on my way I saw not far from the road a newly-erected water-wheel, when I turned in, and ascertained from the man that the wheel belonged to the Vale of Conway Mining Company. I was much pleased with the wheel and all the gear connected with it, which reflects favourably upon the management. Afterwards I had pointed out to me the different lodes that run through this property, and what struck me very forcibly was that I could not understand why such a promising sett had been left until now. The property is intersected by six lodes—three north and south, and three east and west, on two of which lodes the company are now working, and are preparing as soon as the weather admits to bleed the others. The lodes are well defined, and I do not see what there is with proper and economical management to prevent this mine from ranking amongst the first in Wales; and, judging the others from this mine, I do not think that the reports are in the least over-coloured. The men told me that the company only commenced operations about four months ago, and that about 10 tons of ore had been sent to the market, and that a further and a similar parcel was being got ready. These facts speak for themselves, and augur well for the future of the company. I should not be surprised to learn that the shares were to go up to a premium; in fact, I do not see what there is to prevent it. Having spent here more time than I intended I had to retrace my steps without seeing the other mines, but hope to have the pleasure of doing so shortly. W. R.

Nov. 20.

MINING IN NORTH WALES—EAST PANT-DU MINE.

SIR,—A pleasing incident took place at this mine on Wednesday last—the presentation of a testimonial to Capt. William Roberts, of Glan Alyn, in recognition of his discovery of one of the finest veins of lead found in the district for years. The discovery has given employment to a large number of men, and hence the miners at East Pant-du, Black Mountain, and Belgrave Mines all contributed to the testimonial, which consisted of a handsome gold hunting watch, and massive 18 carat gold chain. There are 70 men now employed upon the mines, and the monthly production of lead is about 34 tons. Mr. Morgan, who acted as secretary (in the absence through illness of Mr. Thomas Williams, honorary secretary, to whom the success of the movement is in a great measure due), read the address in Welsh and English, and Capt. Roberts made an excellent reply, in which he said that he was proud of it as a token, not only of any respect they might entertain towards him but of the good feeling which existed between employers and employed at the mines of which he had the management. He sincerely trusted that feeling would continue, and that it would flourish at other places on the mountain, so that the whole district would prosper and become a hive of industry. He felt convinced that the mountain was a very rich one, and that with proper engineering apparatus would amply repay any outlay laid out upon it. In the present depressed state of the country such a result would be doubly welcome, and he sincerely trusted that the day was not far distant when his hopes and their hopes in that respect would be accomplished.

Only a very small proportion of the men at the mines are employed in getting the lead, the bulk being engaged in driving levels, so that the property may be opened out in a thoroughly miner-like manner. The further the levels are driven the more the value of the mines is enhanced, as new discoveries of a most encouraging nature are constantly taking place, and were the men wholly employed in the production of lead the output would be more than 200 tons a month for some months to come. The property is acknowledged to be an exceptionally valuable one, and the entire district is looking very encouraging, so that Mr. H. Lloyd Jones could very justly say with regard to the town and trade of Mold that he knew of no town in North Wales, of its size, which had a better class of business. The tradesmen, as a whole, he believed were sound, and their credit was high in any market they might attend. Some of them were interested in the mines surrounding the town, and he trusted that by the Halkin Drainage Scheme and other means the district would yet become one of the most thriving in North Wales.

Having been underground yesterday, I am able to confirm all that has been said about East Pant-du Mine; there is no doubt there has not for many years been a company able to boast of such a success in this county as has now been attained here. The amount of work done has been simply driving and sinking, the greater part of which has been in ore ground. I paced the 20 fm. level for about 40 fms. over a continuous run of ore ground, from which I could easily in a few hours extract from 2 to 3 tons. The 30 fm. level is opening out equally as well, while the lead passed over seemed stronger; and there is every reason to believe the next level opened will show a still further improvement. The mine is upon the same range and formation as the Bryn-Gwyn, Bryn-hyfryd, Pwll-y-wheel, Jamaica, and Lisburne are upon. The monthly sales at present are about 34 tons, but in a short time they can be increased to 200 tons. Capt. Roberts has shown a great amount of practical knowledge in his selection of the ground to sink the shaft in, having had only to sink 15 fms. ere the flat, together with the masterly lode they are now operating upon, were intersected; and he is well worthy of the handsome testimonial presented him. The mine being in private hands, it does not create outside its local circuit the sensation it otherwise would have done. But it is time capitalists should open their eyes, as this part of the county has too long been neglected. East Pant-du is only one out of a large number of rich mines that remain one day to be opened out. There lies a tract unexplored for miles in length north and south of this now famous mine bearing all the characteristics contained here, and I trust this grand discovery will give an impetus to mining in the neighbourhood, which has borne its share in the general depression.—*Llanarmon, Nov.* 21.

J. A. EDE.

YSTRAD EINION MINE.

SIR,—In the Supplement to the Journal of Oct. 27 there appeared a letter, signed "J. D.," containing unfavourable remarks on this mine. Having been asked to visit the mine on one occasion, I have been considered by parties interested to be the author of that letter. So far, no doubt, the writer has gained his object. I shall feel obliged, however, by your allowing me to state that I did not write the letter in question, and that I knew nothing whatever of it until my attention was drawn to it yesterday. JOHN DAVIS.

Aberystwith, Nov. 20.

TREBEIGH CONSOLS MINE.

SIR,—The Journal of last week contains a letter, signed by "A Holder of 200 Shares" in the above mine, in which the expediency of changing the concern from the cost-book system to a limited liability company is advocated, and the wishes of the shareholders generally upon the proposed change are requested. I think, in the first place, that "A Shareholder" might have consulted his co-proprietors without having recourse to your columns, and it is with some considerable diffidence I ask you to allow the latter to be made a medium for reply. I am, myself, one of the earliest shareholders in the mine, and "one who has always promptly paid his calls." Your correspondent says that "the small driblets of capital coming in from the calls are quite insufficient to carry out the work of exploration with sufficient vigour;" and, to my mind, uses other unsound reasoning—such, for instance, as supposing the public will subscribe 10*s.* per share for what they can buy in the market at half the price. I will sell one hundred shares at the lower figure. I have read his letter carefully, and can detect in it nothing but a plea for non-payment of calls. Capital should be as easily found on the cost-book as the limited liability system. Progressive mines must for a time make calls, whichever system is adopted, and the cure for all the evils "A Shareholder" depicts and appears to dread is a honourable payment of those calls of which, unfortunately, there is a large amount in arrear. "A Shareholder" should openly make his wishes known at the general meetings (not trouble you). It is, however, a fact that some shareholders have forfeited their privilege of doing so by non-payment of calls. I trust such is not the reason for your correspondent resorting to your columns and withholding his name.

What is the committee of management about that it does not enforce by legal process the payments justly due by those who are ready to take a share of the profit if the mine is a success, but leave their brethren to bear the brunt of the risk? The managers owe this duty to the shareholders generally, and should not flinch from it even if one of their own number be thereby compromised. I am not fond of appearing in print, but as I could not refrain from replying to the letter in question, and deprecate the shelter of an anonymous cognomen, I subscribe myself— ULYSSES LATREILLE.

Gresham House, Nov. 19.

THE PRESENT AGE.

SIR.—The progress of the world's industry and enterprise, we are assured by Mr. Gladstone, proceeds by "jumps and leaps," and not by measured steps, as in times of old. We are informed by the same eminent authority that the wealth of Christendom has increased during the nineteenth century more than all its previous accumulations for 1800 years after the birth of Christ. That the astounding wealth acquired by Great Britain alone renders the peasants, the artizans, the manufacturers, and the laborers more independent and free members of society than any of the aristocracy of the globe, however happily placed in other countries. We have so far advanced in the present century as almost to record its history, and to affix to the scroll of time the manifest improvements—scientific and mechanical, social, intellectual, and material—of this eventful period of Mr. Gladstone's reflections.

In the past century we have had the close of the American Independence, the French War, and the annihilation of Napoleon; we have had the Emancipation of the Slaves, the Crimean War, with that of Abyssinia and other epidemic disturbances, now the aggression of Russia on Turkey. Against these we have cheap postage, cheap literature, railway locomotion, and telegraphy thrown in, chiefly advantages to labour at the expense of capital. The community at large have been relieved to the extent of 70,000,000*l.* annually in the remission of taxation during the last 25 years, with the impost on trade, commerce, and property augmented about one-half, so that the workman and labourer can have a free breakfast and dinner without duty or tax, whilst capital has to supplant him in its contribution and support of imperial taxation to the extent of some 35,000,000*l.* over the same "cycle." These momentous figures are worthy of cool and earnest reflection. If the labourer has no, or little, taxation, and a house built for him by the industry of his ancestors, why should there be strikes and contentions between master and man, and especially when the labourer is 50 per cent. better off in wages, with freedom from taxation that render his position 50 per cent. better than that of his father and grandfather 30 to 50 years ago, with social and intellectual amelioration wholly unknown antecedent to his own history. The main point is to determine whether a man born to toil and labour is to live by the use of his hands and the sweat of his brow, or to rest content thriftless and idle on the accumulated earnings of others. It may be a fact that he inherits something from his ancestors, but with, or in its absence, why should he endeavour to fritter away the means of capitalists through a life of indolence and wearisome dissipation. The life of a man out on strike is an outrage on progress, an ignoma on individual effort, and an *effete* example of negative manhood. Industry is the source of wealth, integrity, and honesty of purpose, the advancement of social and intellectual progress, while indolence is the cause of misery and the curse of society.

Leaving strikes, lock-outs, and contentions of capital and labour to subside for the present, let us for one moment reflect on the Divine announcement the "Earth is Mine, and the Fulness Thereof." The Providence of the Universe provides for all time and all circumstances; and it is enacted that industry, thrift, persevering economy, coupled with husbandry and judicious abnegation, the soil shall yield its fruition, and that the human family and the animal creation shall receive sustenance and fodder to maintain life; yet it is indubitably affirmed that toil and labour shall accomplish this end, thence the indolence and opposition of man alone thwart the designs of Nature, and bring about dearth and insufficiency.

Next to the soil we have the hidden resources of the earth, and no country prospers or attains pre-eminence unless the minerals, metals, and products so essential to the progress of society, and the growth of social and material wealth be likewise found in abundance. Yet these chambers are only found at "cycles" as the necessities and requirements of the human family demand. At one moment we have the "cycle" that discovered a Friendship, which infused enterprise and abundance in a district wholly unknown in former ages; a Devon Great Consols that set West Devon in a glow of earnest pursuit of similar discoveries, employing the masses, and enriching the landlords, merchants, manufacturers, and employers, extending the

volume of trade and commerce, while adding to the material wealth of the nation. Again, we had in Montgomeryshire the Van, the prize of 50,000*l.* a year, the pioneer of numerous adventurers, and the all but unexampled dispenser of labour and benefits to all classes of society; then we had Minera, Great Laxey, and Shropshire. Lastly, we have in Cardiganshire the Cambrian, a copper mine of astounding promise, though at present in its mere infancy; the lode at the 25 is found to be worth so far as opened 100*l.* to 150*l.* per fathom, and about 9 fms. above it is now found to be almost equally rich, and probably standing whole to the surface; this property is expansive, will employ in its career many hundreds of labourers, require merchandise, material, and machinery in bulk, benefiting trade and commerce, while enriching all associated therewith. Tyn-y-Fron is also a promising mine, and well worthy the attention of capitalists. Bicton, standing to the east of the Caradons, and north of Trelawny and Mary Ann, is likely to create some degree of sensation as the workings progress.

R. TREDINNICK.

Exchange, Coleman-street, Nov. 22.

THE MINING INTERESTS.

SIR,—There is no description of property so sensitive and so full of the last stores of Pandora's box as that of mining. Again, there is no medium of investment so fraught with sudden and rapid changes from almost the depths of despair even up to the acme of confidence as that of mining adventure. These changes have been manifestly chronicled lately in the cases of many Cornish tin mines —for instance, Dolcoath, Tincroft, Carn Brea, Cook's Kitchen, East Pool, Agar, Basset, South Condurrow, Wheal Grenville, and South Crofty. A simple advance of 5*l.* to 7*l.* a ton in metallic tin added 300,000*l.* to the commercial values of these properties, and it is evident whenever the markets rally to their normal prices for metals that further advances in the value of tin shares will follow, and of which the one referred to as of recent occurrence constitute but a feeble example. It is a fact ever to be borne in mind that the tin mines of Cornwall were never more productive than at present, and as depth is attained the veins show no signs of ever approaching exhaustion, but, on the contrary, increased vitality and richness. Again, the economy effected in labour through the introduction and growing application of "mechanical boring and dressing machines" will eventually completely revolutionise the antiquated system of mining operations until of late universally pursued throughout the South-West Peninsula. There are many other mechanical changes necessary to be introduced into Cornwall, foremost among which is the drawing skip in the place of the kibble and bed-planking. Would it be credited by miners in the North of England that Dolcoath Mine, sunk to a depth of close on 800 yards, discharges all its ores and debris from underground to surface by buckets attached to chains, and without any guides in the shafts to keep them from swinging to and fro? Yet this mine has been continuously at work for ages, and for the years 1871 and 1872 yielded 30,072*l.* and 46,770*l.* in dividends, equal to 65 and 100 per cent. on the entire capital subscribed—46,170*l.*

There has been recently published by Mr. Charles Thomas, F.S.A., F.G.S., of No. 3, Great St. Helen's, London, a valuable compendium and work of reference under the head of "Investors' Handbook," worthy of special notice. It refers in graphic, yet concise, terse, and careful review to Government securities, home, colonial and foreign, Bank of England, joint-stock companies, assurance, telegraph, gas, water, tramway, tea, shipping, dock, land, mercantile and trading, and miscellaneous companies. To all associated with, or interested in, these varied securities a mass of useful information is conveyed in succinct and elegant, though detailed and forcible, language. It is chiefly with British and foreign mining, however, that the interest of your readers will be enlisted, and these are referred to by the author under several heads mentioned below, and are specially welcome at the present time, when the trade and the commerce of the country are all but paralysed through the contentions existing between capital and labour leading to extending and wide-spread strikes and lock-outs, coupled with the ruinous efforts of the unprovoked and aggressive war on the part of the Municipalite on the stubborn, yet faithful, Osmanli. The author somewhat at length reviews the subject:—(1) Mining Companies; (2) Antiquity and Progress of Mining; (3) Mining a Source of Natural Wealth; (4) Discovery and Working of Mines; (5) Success of Mining; (6) Chief Mining Districts; (7) Colonial and Foreign Mines; (8) Coal and Iron. It is needless to traverse the author in detail, as his observations on this subject alone extend over 214 pages, the whole of which are fraught with intelligence, careful thought, earnest research, and valuable suggestions. In fact, the work as a whole is alike interesting, instructive, and worthy the perusal of the general reader, and should be placed on the table of every well chosen and selected library.

In conclusion, what is primarily required is reform to the root in the conduct of mining affairs. What can justify mines like Dolcoath, Tincroft, Carn Brea, and Basset working from hand to mouth—as they do, and ever have done—practising the phillipics of insolvent traders and merchants, living upon borrowed moneys, and crediting up products in advance of costs? If those mines take two months to pay the labourers, and four months' credit for materials, machinery, and supplies, they should unquestionably keep two to four months' assets in hand to meet outstanding obligations. What would be thought of the London and Westminster Bank, the Royal Insurance, or any other dividend mercantile, trading, commercial, or industrial concern, if they published such periodical balance-sheets as the mining companies referred to?

The lode at Cambrian, Esgair-fraith, has now been cut into at the 10 fm. level, so that its productiveness is now proved for 3 fms. in depth, and continues good at all three points. The future of this mine is likely to give great impetus to industrial pursuits in the Principality.

R. TREDINNICK,
Dealer in Stocks and Shares.

Exchange, Coleman-street, London, Nov. 21.

THE OLD TREBURGETT SILVER AND LEAD MINE.

SIR,—Will you kindly insert the following remarks for the benefit of capitalists, and, under the existing depression in the labour market, for the welfare of the Cornish miners? During the past year a large number of mines in Cornwall have been stopped in consequence of the low price of mineral and the scarcity of the same, under which circumstances, of course, the respective shareholders in the said mines were justified in so doing. But when a thoroughgoing concern, such as the Old Treburgett Silver and Lead Mine, fails to attract the attention of investors, it shows either a lack of interest or ignorance as to the true position and prospects of the mine. We would inform the readers of the Journal that at the time the old company lost 1500*l.* worth of silver-lead through the bankruptcy of a certain smelting firm, and decided to wind up the mine. We (the miners then at work in the mine) declared our willingness to the present manager to work the mine on our own strength and responsibility, but for some reason our offer was not accepted, perhaps owing to the interest of the party to whom we applied running in another direction. Since that time the engine has been working to keep the water, at a cost of about 150*l.* per month, and only six men working underground in the mine. Now, Sir, we (the miners of Old Treburgett) are at a loss to understand why all this money is spent. Can any of the readers of your valuable Journal inform us? Is it that the present proprietors of the mine have a desire to spend a little of their surplus cash?

The only reason we can assign for there not being more men employed is that a certain party is well aware that discoveries would very soon be made which doubtless would prove detrimental to present negociations, for it is well known to us miners that if the 40 fm. level south is driven a few fathoms further it must get into the splended "shut" of ore which has been sunk on in the bottom of the 80. Not only so, but in the 40, south of Masey's shaft, in the last few days working a good elvan course was cut which is rising from the bottom of the end, carrying a good leader of lead from 3 to 4 in. in width. Also in sinking of Masey's shaft below the 40 a kindly lode has been met with, worth from 15*l.* to 20*l.* per fathom, in easy ground, and a deal of ore in many other parts of the mine which it is needless to describe. North of the engine-shaft very little has been done. The 70 has been driven from 20 to 30 fms., and the 90 less; but the ground that has been taken away has produced on an average from 10 to 15 cwts. of lead per fathom. The general opinion of many experienced miners that have lately worked in the mine is that this is the richest part of the sett. And be it remembered that the lead from these same lodes has fetched in the market the extraordinary sum of 36*l.* per ton, and we are confident (although the price of lead is decreased) there are means to make the lead worth at least 30*l.* per ton.

Now, Sir, to prove the faith we have in our assertions, we again offer to work the mine on our own account, and if the proprietors think well of it, we will meet them, or their representative, at the mine, or any place they may appoint, and enter into an engagement to work the mine for 12 months under the following conditions—Dues at from 1-18th to 1-20th, and to pay a reasonable rent for the plant and machinery now standing on the mine. To choose our own manager, not objecting to the lords having someone in the mine to look after their interests. We would advise any agent that comes to inspect the mine to have one of the Treburgett old miners to accompany him. With apologies for occupying so much of your valuable space, we beg to remain—

St. Teath, Nov. 19. THE MINERS OF OLD TREBURGETT.

GWENNAP GREAT ADIT.

SIR,—There are two typographical errors in your copy of my letter of the 12th inst. The first is as to the depth of the adit in North Treskerby, where instead of 30 as stated, it is about 50 fms. deep; the second is in the P.S., where the adit is said to be 3 miles instead of 33 miles in length. That is the length of the trunks and the branches *to* the mines, not including the adit level on the several lodes and the numerous cross-cuts. If we add all those extensions it is probable that the adit will measure 100 miles at least. I think that I am safe in saying that of all works of the kind in the world this is by far the greatest.—*Truro, Nov.* 20. R. SYMONS.

A FATAL PRACTICAL JOKE.

SIR,—A few years before the cessation of works in old Treskerby Mine—which took place in 1828—the agents there in pursuance of their amusements caused the death of a man—of course without the remotest intention to do so. The man was of weak intellect, and they gave him some drink (I think some kind of spirit) mixed with a large amount of pepper, which the poor fellow freely swallowed. It occasioned a violent inflammation in his stomach, which resulted in speedy death. The agents were alarmed at the consequence of their folly; but by the inquest which followed they were not involved in any trouble, as they would be in a similar case at the present day. A verdict of "Manslaughter" would, probably, be returned on such a case now. Half-a-century ago mine agents were not so well conducted as they are now. They were then allowed more drink than they are at present, and were more addicted to drunkenness and foolish talking and acting. R. S.

Truro, Nov. 20.

[For remainder of Original Correspondence, see to-day's Journal.]

ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

TIRITO.—Capt. Wm. Clemo, Sept. 6: In the winze sinking below the 20 fm. level south the west branch in the back of this level has now entirely failed, the ore, like all the other little bunches near the slide, having worn out in a wedge. We have now begun to work on a branch of ore in the first lode, south of the engine-room at the tunnel level, but we cannot yet tell what it is going to make. The timbermen continue to make good progress in opening the tunnel level. The last week's drift was 13 ft. 6 in. The total amount now driven is 91 ft.—Surface: Our costeaning works have nothing yet to notice.

TIRITO.—Sept. 13: The bunch of ore in the first lode, south of the engine-room, below tunnel level, still holds on, but we cannot report much on it yet.—Surface: Our costeaning work is now stopped, as the lode does not appear to show out at surface. We have now commenced a prospecting cross-cut at the tunnel level, to go through the south slide and on towards the Soledad. The timbermen were delayed in the past week on account of the water rising above the back of the 20, and stopping all ventilation in the mine. We have now pumped out the water, and they have resumed work in the end again. The last week's drift was 7 ft. The total amount of level now opened is 98 ft.

Sept. 20.—Tirito: The branch working on the first lode south of the engine-room, below the tunnel level, turns out some good green ore. We cannot give any size to this branch, as the ore is formed in balls and bunches. Our prospecting cross-cut through the south slode at the tunnel level makes good progress; we can drive from 6 to 8 ft. per week. The timbermen have now communicated the tunnel level, but we have yet to put in some more sets of timber between those already in, as this stull has now a much heavier load than it had before the fire on account of the horse of ground between the two lodes having broken off, and is now lying on to the stull. We have also to replace some of the timbers in the part of the stull that was not burnt, as some of these are broken from the same cause—the horse having broken off. We have started the engine to pump out the water, which is now at the 20. The Mina Grande shaft is full of water to the tunnel level; we shall commence to pump the water out there as soon as we can finish the stull and get in the launder.

Sept. 27.—Tirito: The branch working in the first lode has no change to notice. Our prospecting cross-cut through the south slide at the tunnel level continues to make good headway. The timbermen are getting on well with the stull. I hope in two weeks more to have it all finished, and to be working in the Mina Grande. Our engine and pumps in the Tirito shaft are working splendidly. The water is now 3 ft. above the 32.

Oct. 4.—Tirito: The branch working on the first lode, south of the engine-room, below the tunnel level, continues the same as last week. Our prospecting cross-cut through the south slide at the tunnel level has no change to report. The ground is still good for driving. The timbermen will finish the timbering, putting in launders, and the tramway in the tunnel level by the end of this week. The water in Tirito engine-shaft is now in fork to the 42. We are putting in a pump to take out the water below the 42, instead of hoisting it out with the bucket as we did formerly.

Oct. 11: Tirito: The branch working in the first lode, south of the engine-room, below the tunnel level, appears to be slightly improving in quality. Our prospecting cross-cut through the south slide at the tunnel level continues the same as last week. We have now got the pump to work in the 42, and the water is now 55 ft. below the 42. The winze sinking below this level will be resumed to-morrow. We have been timbering it over, as the walls above were rather bad for sinking under. We have also got the windlass fixed. The stull, tramway, and launders through the tunnel level are now completed. The amount of ground spilled through was 120 ft.—Providencia: We have now begun to work again in this stope, and I am of opinion that this place is slightly improving.—Mina Grande, West Branch: We have commenced to stope the bottom in this place. It looks well. We started to pump out the water in the Mina Grande stope yesterday. Our pumps are all working very satisfactorily.

Frank W. Breach, Sept. 13: The spilling in the tunnel had to be stopped for three days, while the pumps were set to work to lower the water in the 20 to obtain ventilation, and which through starting the engine in its turn stopped ventilation in the tunnel, so that the pumps are stopped while the men finish the last 10 or 12 ft., after which all will be plain sailing, and everything will go on as before. In order to pump the water out quicker than the time I estimated it would occupy we have increased the stroke, and I think in between three and four weeks pumping we shall fork the water. Having now obtained all the information we expected in the costeaning works; they are stopped in favour of driving a cross-cut through the slide, and under the Soledad old works. Although I doubt our ability to continue the work, we started the cross-cut this week, and every attempt will be made to at least get through the slide and see the ground on the south side of it. I am the more in hope of accomplishing this part of the work, as the ground to the slide, a distance of 60 ft., will be easy, and in consequence cheaply driven. It must not be supposed that we are at all disappointed in not finding ore in the costeaning works in passing over what we believe to be the back of the lode. Capt. Clemo and myself have made a close examination of the surface of the Tirito Mine without finding any indication that the ore reached the surface in the old works, but, on the contrary, many proofs that it did not do so. The ore always dipping to the south would cause the cap of the Tirito course of ore to be at least 100 ft. below the surface south of the slide.

Sept. 20: I am very glad to report that the tunnel is again open, and the spilling finished. The timber will have to be doubled to enable it to bear the great additional strain now thrown on it; but this will soon be completed, and will not interrupt the working of the mine in the meantime. The pumps are at work in the Tirito shaft, and the water is lowering steadily, and as soon as the extra timbering is finished in the Virgin stull, and the pipes or launders laid to carry the water, the Mina Grande pump will also start. The mill is kept busy stamping, and concentrating green rock thrown aside in past times from the spalling floors, but which is now a considerable assistance.

Sept. 27: During the past week the additional timbering in the tunnel has been completed through the Virgin stull, and the track laid. There remains some weak ground to take down, and the timber to put in where the tunnel enters the Providencia from the Virgin, after which (say, in 10 days) we shall commence breaking ore in the Mina Grande, and pumping the water from the Balvanera shaft to enable work to recommence in the 24 fm. cross cut and the winze from the 12. On the face of the south slide where it crosses the tunnel we have at some 5 ft. below the level a vein of very fair green ore, which we are following. It is but 18 in. width, but appears to widen as it goes down. We are cross cutting a few feet from the bottom of the winze near the engine in order to prove the vein at 30 ft. in depth, as the face of the slide has never been explored about the tunnel level, and it may carry a vein of ore. The south cross-cut from the tunnel is in easy ground, and advances 7 ft. per week. I do not expect a change of ground until we reach the slide. The water in the engine-shaft is lowering rapidly, and we are in hopes of reaching the 42 in a few days, when the ground over the winze will be timbered, and men set to work in the bottom, on the ore discovered some time since. The stamps are all employed for 14 hours per day crushing the ore from the old waste heap at the spalling floor for concentration, and which yields very fairly. The furnace is employed on ore from the Mina Grande waste heap, which so far shows very little diminution, and continues to yield well. The erection of the new furnace is being pushed on as much as possible, but until after the second week in next month is past very much cannot be done in consequence of the unsettled weather. We are putting up the fan and cupola in order to have the castings ready, after which, should the moulder turn out a good hand, I will have some few tons of stamp-heads and dies cast.

Oct. 4: You will observe by Captain Clemo's letter that the timbering will be finished this week, and the tunnel will then be open as usual, and work will recommence in the Mina Grade, and the pumps set to work in the Balvanera shaft. In the Tirito shaft the water is down to the 42, and to-day they are putting in 12 fathoms of pumps to fork below the 54. As soon as these are in we shall commence work in the 42 winze, and I hope next week to report on the ore there. Now that all the repairs are finished everything will go on as before the fire.

Oct. 11: Since writing last week all the repairs in the tunnel are completed, and ore is again being broken in the Mina Grande from the new west branch, from where we shall continue to extract the ore required for the furnace until we get the water out, when the winze sinking in the 12 will keep up the supply, and at the same time explore the lode to the 24. The engine on the surface is now pumping the water from this mine. In the Tirito we shall to-day break ore from the 42 winze, and continue to explore on the course of ore at the bottom. The water will be in fork in the engine-shaft sometime next week, when we shall get the new column of pumps into the cistern at the 54, put in the pent-house, and if possible drive the 54 north and south at the same time. I should also sink the shaft, but I am afraid our means will not permit it.

The work being done in the Providencia, mentioned in Capt. Clemo's letter, is immediately over the tunnel level, and from the facility thus ensured of handling the ground broken cheaply it more than pays expenses. The ore is of a very good class, with more than an average quantity of petanque, but, like nearly all ore in this mine (Providencia), it exists only in balls, and is not continuous. During the week we have found some rich ore on the face of the south slide, in what is known as the first vein in the tunnel. It is nearly white, and has no appearance of ore, and simply from its weight I was induced to get a stone assayed. It gave $332 per ton for silver, and contains a great deal of carbonate of lead, and is only spotted with copper stains. The branch containing this is only a few inches wide, and whether all is equally rich nothing but a trial can prove. We are driving the end south.

— On Nov. 22, the directors received the following telegram from Mr. Breach, dated Nov. 7:—No profit for October. Lode cut south of south slide. Ground improving towards the south.

MINING IN AUSTRALASIA—MONTHLY SUMMARY.

THE MOONTA MINE.—The sixteenth annual report of this mine states that, owing to the continued depression in the copper market, the directors have since June last "curtailed the operations at the mine so far as the raising of the richer ores is concerned," and gives reasons for the apprehension that there may be a cessation of dividends for some little time to come. For the six months ending with Sept. 30 there has been very little diminution in the production of ore, the figures being 10,274 tons, averaging 20 per cent. of pure copper; but this, although yielding a profit above working expenses, has been insufficient to justify the continuance of the usual dividend. At the beginning of the half-year there was 3997 tons of ore on hand, so that the directors have had during the period under review a total quantity of 14,271 tons available for sale. Of this 10,480 tons have been disposed of to the Wallaroo Company under the current agreement with that company for 102,258*l.* 4s. 2d. The working expenses were 93,186*l.* 5s. 6., leaving a net profit of 9071*l.* 18s. 8d. The balance to the credit of profit and loss, taking into account the plant and machinery, which are valued at 171,458*l.* 4s. 11d., and the ore on hand, estimated at 37,910, is 159,274*l.* 18s. 11d. Mr. H. R. Hancock, the superintendent, contributes a report of the work that is going on in 27 shafts, and from this we gather that the yield varies from 1 ton to 7 tons per fathom, with a richness ranging from 12 to 28 per cent. In connection with Taylor's shaft it is stated that a winze has been sunk below the 145; that in this shaft there are the deepest workings of any in the mine, and that at the deepest point the lode is very remunerative. Capt. Hancock adds that "a large quantity of ore ground is held in reserve until such time as the price of copper shall sufficiently advance to induce the directors to give instructions to have it extracted," so that should a favourable change in the copper market take place the mine would probably soon be able to resume the payment of the handsome dividends which for years past, with very few interruptions, it has been enabled to pay. The company's establishment consists of 1673 persons, including 946 miners, 93 mechanics, 370 labourers, 246 boys, and 18 officers. We trust, for the sake of the development of the mining interest of the colony, and on account of the large number of persons who are specially dependent upon the successful working of the Moonta mines, that the present period of depression will speedily pass away.—*South Australian Register.*

KURILLA.—This mine goes on just as usual, opening up remarkably well. During the last two months between 400 and 500 tons of ore, of nearly 20 per cent., have been sent away for England, and there are about 200 tons left on the floors of equal quality. On the Kurilla lode the engine-shaft is being enlarged with the object of deepening it still further to get down on the ore already discovered east of the shaft from the 45 upwards. Whilst a splendid run of ore ground has been driven through at the 45 east, we hear of the company having recently come upon what appears to be a new run of ore still further east, said to be worth 50*l.* per fathom. This same drive is being extended westward to intersect the ore lying in the 25 at and under Deeble's and Grainger's shafts, and some good ore is already met with. On Morphett's lode the engine-shaft, now 30 fms. deep, is being sunk on a fine lode that has given all the way from the 20 downwards from 6 tons to 10 tons of good ore per fathom. It is, therefore, anticipated that the 30 drive will open up a fine run of tribute pitches for a great length. Even at the low price of copper this young mine is paying its way, and should the price go up it would at once become profitable to its proprietors.—*York Peninsula Advertiser,* Oct 5.

AUSTRALIAN MINES.

ENGLISH AUSTRALIAN (Gold).—Capt. Raisbeck, Oct. 3: We have extended the south drive 320 ft. level 52 ft. distance from cross-cut 364 ft. The lode continues small, but there are strong leaders on the west side. I have broken a little of the stone, and from its present appearance should produce gold when worked. This we cannot conveniently do until we have holed to the prospecting shaft. I have 40 tons of stone in the mill; we have not cleaned up as it is uninportant. I have seen a few specks of gold, but the stone is poor. This drive will be stopped for a time, when commencing to sink the engine-shaft, as we shall have to disconnect the air-pipes. To save expense I purpose driving sufficiently south to connect with the prospecting shaft before commencing to further sink the engine-shaft. Having finished the erection of the whim, we called for tenders, and let the timbering of the prospecting shaft, about 110 ft., at 2*s.* 5*d.* per foot. When this is finished we shall call for tenders to sink the shaft the required depth, if there is sufficient money in hand. We have crushed for the public 7 tons of stone during the month. To sink the engine shaft and prospecting shaft, and to continue driving south will require the sum of 320*l.* monthly. If we are obliged to use the patent cages, according to the mining statute, they will cost us 50*l.* extra. With respect to the amount of gold likely to be obtained, I cannot say what may be met with in prosecuting the works.

PORT PHILLIP AND COLONIAL (Gold).—The total quantity of quartz crushed on the company's and tributors' accounts for the month ending Sept. 12 is 5263 tons; total gold obtained, 2317 ozs. 16 dwts. 12 grs.; receipts (including 2380*l.* 10s. 2d. obtained from tributors), 4864*l.* 7s. 10s.; payments, 2909*l.* 7s. 1d.; profit, 1755*l.* 0s. 9d., added to which was previous month's balance of 2355*l.* 6s., making an available balance of 4110*l.* 6s. 9d. The amount divided between the two companies was 1800*l.* The Port Phillip Company's proportion of which is 1170*l.* The balance of 2310*l.* 6s. 9d. was carried forward to next month's account. Remittance, 1150*l.*

SCOTTISH AUSTRALIAN.—The return of coals sold during the month of September had not reached Sydney at the date of the departure of the mail. The completed return of sales of coal for the month of August amounted to 18,723 tons.

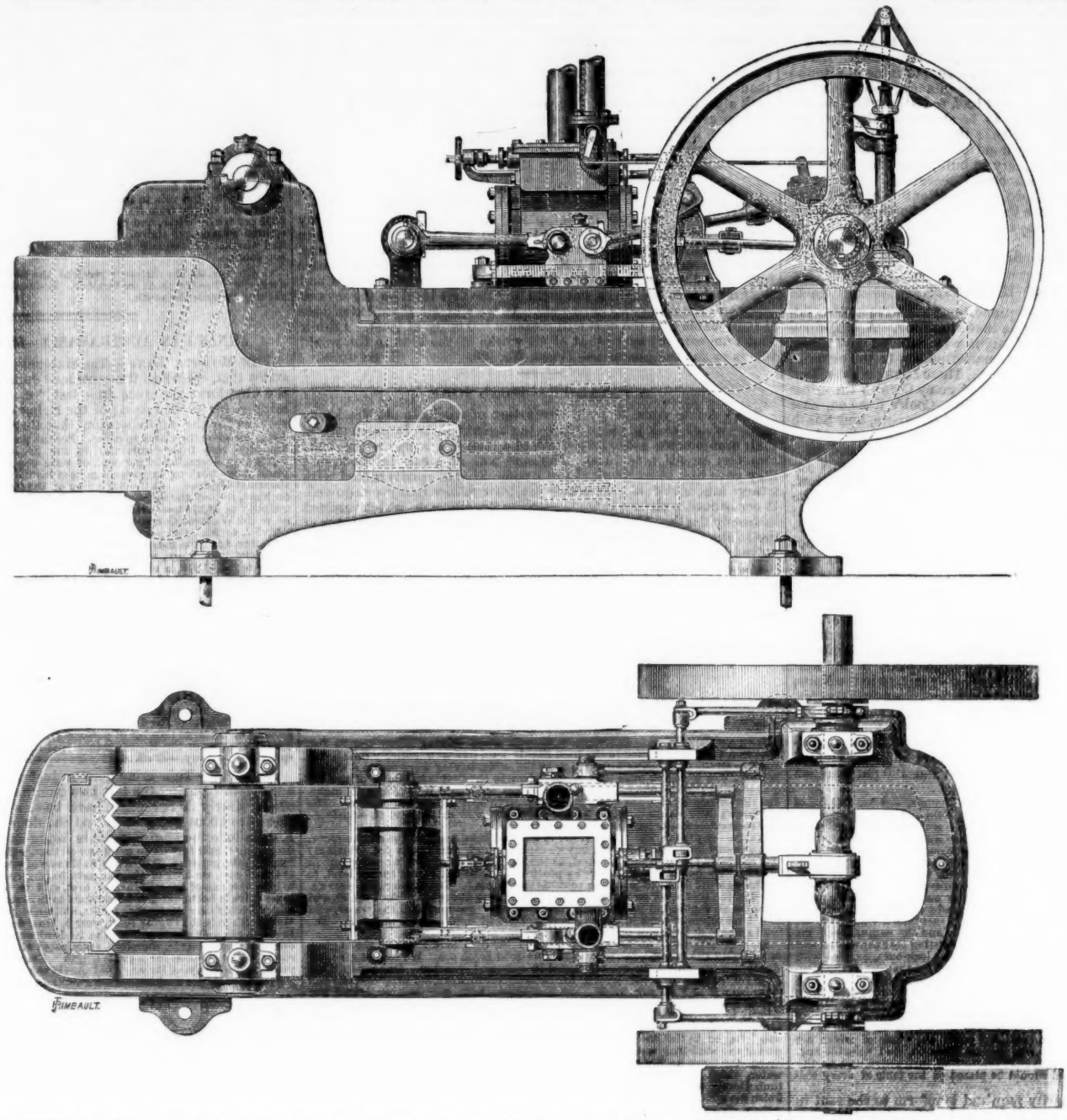
YORKE PENINSULA.—The directors have advices from the Committee of Inspection at Adelaide, with reports from the Kurilla Mine, to Oct. 1:—Kurilla Lode: At the 45, east of Hall's shaft, the lode for the greater part of last month was comparatively poor. On Tuesday last, however, a little ore was met with, which continued to improve until Saturday, when it was 4 tons of 20 per cent. ore per fathom, or (say) 40*l.* per fathom. The drive is re-set to four men, at 7*l.* 10s. per fathom. Allowing for the westerly dip of the ore at an angle of 45°, this shoot has not been seen in any of the upper drives, and is, therefore, an entirely new new piece of ore ground. At the 45, west of Hall's, I continue to drive by four men, at 9*l.* per fathom. The lode is wide and healthy in appearance, and contains more ore than at any place since leaving the shaft; indeed I am now hopeful that we have got over the unremunerative part of this work, and that even as a speculative undertaking, independently of the main object—that of draining Grainger's shaft—we shall have no reason to regret the expenditure. The 45 fathom level east has so far drained the bunch in the bottom of the 35 fathom level, as to make sinking practicable. This work is begun to-day. It is my intention to sink to the 45 fathom level before setting it on tribute. The tribute pitch in the back of the 45, west of the hauling shaft, is set to four men, at 5*s.* in 1*l.*, or a reduction of 1*s.* 8*d.* in 1*l.* Five other men are working on tribute on this lode. . . . Morphett's Lode: The engine-shaft is 11 fms. 3 ft. below the 20. The lode in the bottom of the shaft is more or less disordered and split into veins, but the yield of ore is equal to 7 tons of 17 per cent. I may add that our prospects in this shaft are remarkably good. The 20 fm. level driving east still continues to lay open tribute ground of (say) 8*s.* to 9*s.* in the pound. This drive is now about 37 fathoms east of the engine-shaft, and will very shortly enter on the best ore ground that the 10 fm. level was driven through at and about No. 1 shaft. I have before reported having intersected a cross-course in this drive, the water from which rendered pumps necessary for Morphett's shaft. During the past month I have driven on this a distance of 9 ft. south, and cut two small but rich veins of ore, which will pay for tribute works.—Ore Returns: The committee advise a further shipment of 106 tons of 18 per cent. ore, valued at 1109*l.* net, making 415 tons now afloat, and leaving on hand at the mine ore of the value of 2806*l.* net.

IRON AND STEEL RAILS.—Exports of rails during the ten months ending Oct. 31: 1876—Iron, 175,350 tons; value, 1,313,043*l.*; steel, 142,240 tons; value, 1,335,187*l.* 1877—Iron, 154,423 tons; value, 1,022,384 tons; steel, 199,016 tons; value, 1,640,227*l.*

Messrs. PIXLEY and ABELL—GOLD: A few small orders for Spain have been filled up from the stock that remained over from last week's arrivals, and the balance, 44,000*l.*, has been sent into the Bank. There is at present no demand for bars, and it is expected that the bulk of the 562,420*l.* expected on the 26th inst. from Australia will also be purchased by that establishment: 100,000*l.* in American gold coin has been withdrawn for transmission by the Scythia to New York. The Bokhara has brought 40,080*l.* from Bombay.—SILVER: There have again been considerable fluctuations since our last; rising to 54⅝*d.* at the beginning of the week, it has gradually fallen to 54¾*d.* to 54⅜*d.* The demand has been principally for Spain, as owing to the decline in the value of money in India, and the fall in the Exchanges, there appears to be but little inclination to make purchases for the East. The arrivals have been small, comprising only 15,000*l.* from Germany, and 13,000*l.* from New York. The P. and O. steamer leaving to-day takes 30,200*l.* to Bombay.

HOLLOWAY'S PILLS.—It is difficult to determine what is the more trying to health, intense cold or excessive heat, though everybody knows that sudden transitions from the one to the other teem with disease, which may in most instances be staved off by an early resort to these purifying, regulating, and strengthening pills. This well-known and highly-esteemed medicine affords a safe and easy remedy for almost every constitutional wrong which climates, changes, or dietetic errors can engender, and effectually removes any weakness self-indulgent habits may have induced. In all conditions of the system bordering on disease indicated by apathy, listlessness, and restlessness, Holloway's pills will prove especially serviceable in begetting a vivacity appreciated by both sound and sick.

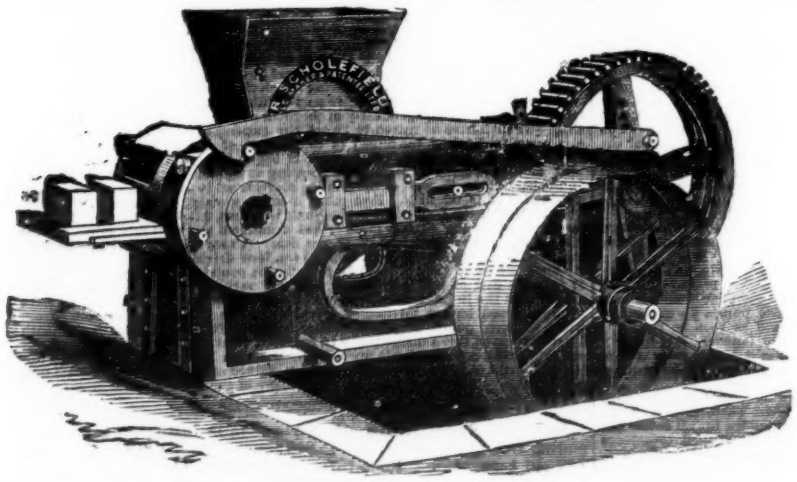
H. R. MARSDEN'S ORE CRUSHER AND ENGINE COMBINED—NEW ARRANGEMENT.



We illustrate a new arrangement of Ore Crusher and Engine combined, by Mr. H. R. MARSDEN, of Leeds. In drawing the attention of our readers to these machines we need hardly say they are of the usual well-known type of that firm, and that the ore crusher is fitted with H. R. Marsden's new patent reversible jaw, by which means stone is cubically broken for the roads, or if the machine is used for crushing purposes it is then fitted with jaws of such construction as will most effectually do the work for which they are set out, but the great advantage resulting from this new arrangement, and to which we are particularly desirous of calling attention, is in the fact that now the engine can be detached from its special working of the ore crushers, and set to run as a separate engine to drive a mortar mill for making concrete, or a winding drum can be attached, by which it would bring up stone, or, as will be easily seen, it may be used for an infinite variety of purposes when not wanted for ore crushing. Its manner of detachment is very simple, and, therefore, of more value than if at all complicated; it is effected by removing the two pins out of the sliding block, and turning the corresponding arms over, when it can at once be put to any other purpose required of it. Another important feature in the ore crushers is the increased wearing surface of the toggle ends, and the front toggle being made to expand or contract for the adjustment of the different sizes of stone, the ends being clasped by caps. The machine does not require an india-rubber spring to bring the jaw back, that being effected automatically. The engine cylinder is fitted with expansion slide valves, so that if it is only required to break or crush light material, or do light work of any other kind, it can be so set, and when necessary have full pressure of steam. There can be no doubt that the advantage arising from the use of these well-known machines are becoming every day more fully known and appreciated. The wonder is that in spite of the number already sent out there should still be those who stick, in spite of all evidence, to the antiquated style of breaking or crushing by hand.

R. SCHOLEFIELD'S
LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pit's during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

	£	s.	d.
2 men digging, each 4s. per day	0	8	0
1 man grinding, 4s. 6d. per day	0	4	6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0	2	0
1 boy greasing, 1s. 6d. per day	0	1	6
1 engine-man, 5s. per day	0	5	0
1 man wheeling bricks from machine to kiln, 4s. per day	0	4	0
Total cost of making 10,000 pressed bricks	£1	5	0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.

As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS
KIRKSTAL ROAD, LEEDS.

AIR-COMPRESSING MACHINERY.—The principal object of the invention of Mr. G. H. FISH, of Manchester, is to effect the opening and closing of the induction valves of such apparatus by positive mechanical means, instead of allowing the opening to be effected by the formation of a vacuum within the cylinder, and the closing by the compression of the air therein. The induction or inlet valve at each end of the cylinder he forms of an annular or cylindrical shape, and of smaller diameter than the inside of the cylinder, the inlet openings passing through the cylinder ends, and being arranged in a circle just inside the inner circumference of the cylinder. The piston he makes in the form of a hollow cylinder, open at each end, but with a solid disc in the centre. The open cylindrical ends of the piston are of such a thickness that they can pass into the space between the interior of the cylinder and the exterior of the annular induction valve, and the latter is provided near to its edge either with a ring of india-rubber or with springs to create a certain amount of friction or drag between the piston and the inner edge of the valve. The outer edge of the valve is provided with two or more rods passing out through the induction openings in the cylinder end, and each connected to the outer end of a short lever, which levers are arranged radially to the cylinder, having their inner ends close to the piston rod, and their fulcra about midway between the two ends. A collar fixed tight on the piston rod acts on these levers. The delivery valves are arranged radially round the circumference of the cylinder at each end, and he has also a central valve at each end in the cylinder, and close round to the piston rod. There are side openings in the open cylindrical end of the piston corresponding with the radial delivery valve openings. As soon as the piston commences to move in either direction, the internal circumference of its open end acting on the indiarubber ring or springs before mentioned draws the cylindrical induction valve in the same direction, opens it, and then immediately quits it. As the piston arrives at the end of its stroke the collar on the piston rod comes against the inner ends of the levers, and closes the induction valve. At the return stroke of the piston the same operations take place at the other end of the cylinder, and so on alternately.

CHANNEL ROCK.—The invention of Mr. J. R. LEAVER, of Queen Victoria-street, has for its object more particularly the cutting of a channel or groove in slate and other like minerals, for the purpose of enabling blocks or layers of the same to be successively broken away or removed; and it consists in the employment of a bar or column, having mounted thereon a rock-boring machine, fitted with a suitable cutter, to which machine a reciprocating to-and-fro motion is imparted along such bar by the aid of a rack and pinion, an endless chain, or screw, or other convenient means of transmitting motion, whereby the cutter with which the machine is provided is caused to cut a channel or groove in the slate or other mineral, which is thence removed from its bed in blocks or layers without blasting, and the liability to injury, and the waste attending the ordinary method, is thus entirely obviated, whilst at the same time the operation is performed in an expeditious and efficient manner.

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD,

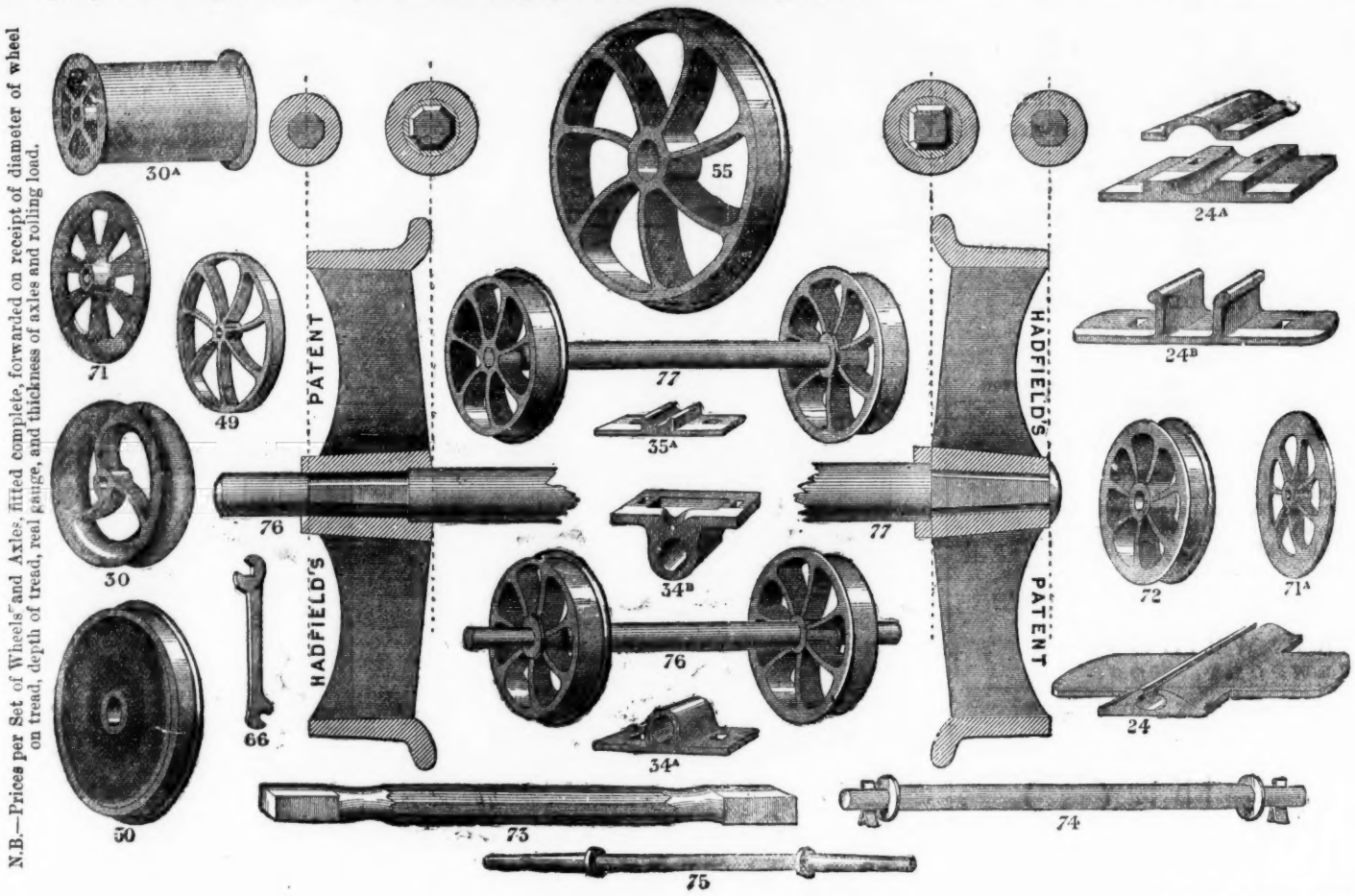
DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS, for Engineering and Machine Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



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HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heaply fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

LOCOMOTIVE TANK ENGINES

FOR MAIN LINE TRAFFIC, SHORT LINES COLLIERIES, CONTRACTORS, IRONWORKS, MANUFACTORIES, &c., from a superior specification, equal to their first-class Railway Engines, and specially adapted to sharp curves and heavy gradients, may always be had at a short notice from—

MESSRS. BLACK, HAWTHORN, AND CO.,
LOCOMOTIVE, MARINE, AND STATIONARY ENGINE WORKS,
GATESHEAD-ON-TYNE.

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MINING ENGINEERS, MINERAL AND METAL MERCHANTS,
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Mines inspected and reported upon.

BICKFORD'S PATENT SAFETY FUSE
FOR CONVEYING FIRE TO THE
CHARGE IN BLASTING ROCKS, &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXPOSITION," held in Paris, in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Altona, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova, South America, 1872.

BICKFORD, SMITH AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES of SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

BENNETTS' SAFETY FUSE WORKS,
ROSKEAR, CAMBORNE, CORNWALL.

BLASTING FUSE FOR MINING AND ENGINEERING PURPOSES,
Suitable for wet or dry ground, and effective in Tropical or Polar Climates.

W. BENNETTS, having had many years experience as chief engineer with Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of his own manufacture, of best quality, and at moderate prices.
Price Lists and Sample Cards may be had on application at the above address
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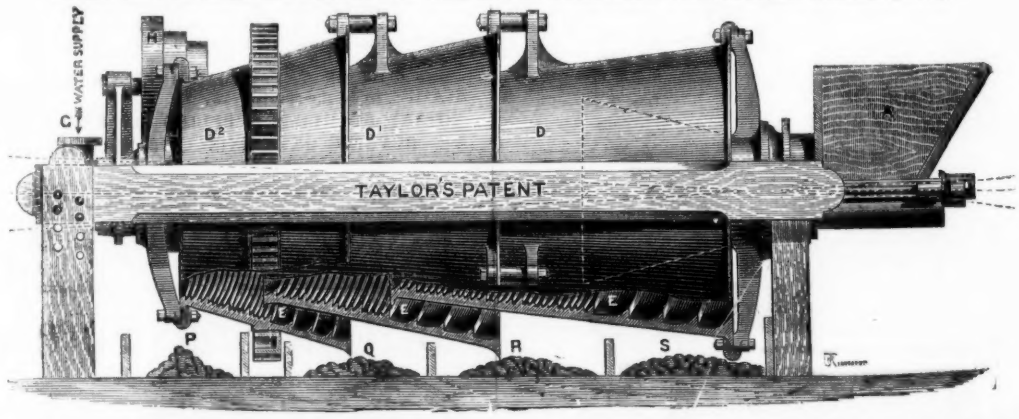
MANUFACTURE RAILWAY CARRIAGES and WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by immediate or deferred payments. They have also wagons for hire capable of carrying 6, 8, and 10 tons, part of which are constructed specially for shipping purposes. Wagons in working order maintained by contract. MANUFACTURERS also of IRONWORK, WHEELS, and AXLES.
EDMUND FOWLER, Managing Director.
WAGON WORKS,—SMETHWICK, BIRMINGHAM.

FIRST SILVER MEDAL AWARDED BY THE ROYAL CORNWALL POLYTECHNIC SOCIETY, 1876.



TAYLOR'S PATENT DRUM DRESSER,

FOR SEPARATING AND SIZING MINERAL AND OTHER SUBSTANCES.

By the aid of this invention any materials, which are of different specific gravity, can be concentrated and sorted mechanically, while in the case of ores the fine mineral is brought up with the larger particles instead of being washed into the waste—a most important feature.

This machine uses very little water in proportion to the quantity of material treated, and will be found a most useful and efficient dressing apparatus.

For further particulars, and to see machines at work, apply to the Patentee,

H. E. TAYLOR, 15. Newgate Street, Chester.

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NEAR VICTORIA STATION, MANCHESTER
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Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

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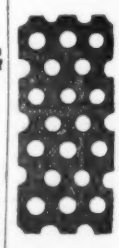
Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

Shipping Orders Executed with the Greatest Dispatch.



LAMBERT BROTHERS,
Alpha Tube and Fitting Works,
WALSALL.

Boiler Tubes, Hydraulic Tubes,
Sluice Valves, Hydrants,
Stop and Draw-off Cocks,
Boiler Mountings,
Safety Valves, Pumps, &c.

ALEXR. WILSON & CO.,
VAUXHALL IRONWORKS.
L O N D O N , S.W.,
MANUFACTURERS OF

THE VAUXHALL DONKEY PUMPS.
THE EXCELSIOR DIRECT-ACTING PUMPS.
HIGH-PRESSURE SCREW ENGINES
COMPOUND SCREWS ENGINES.
PATENT SURFACE CONDENSING ENGINES.
PATENT PADDLE ENGINES.
HOISTING MACHINERY.

ILLUSTRATED AND PRICED CATALOGUES ON APPLICATION.

RAILS FOR SALE.

Bridge Section, 10 to 25 lbs. per yard.
Flange Section, 16 to 70 lbs. per yard.
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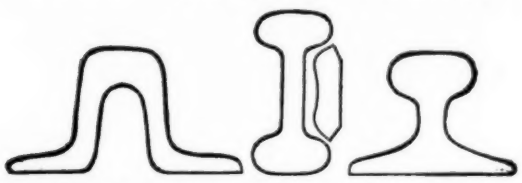
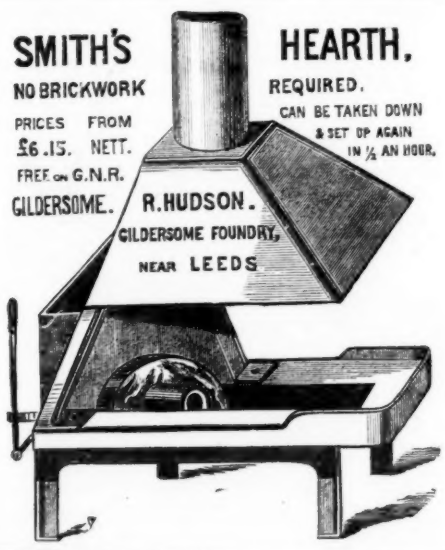
Steel Rails, 30, 36, 54, 58, to 66 lbs. per yard.
NEW PERFECT, NEW DEFECTIVE, AND SECONDHAND IN STOCK.
PERMANENT WAY RAILS, of all sections, made to order.
For sections and price, apply to—
ROBERT WRIGHTSON,
NEWPORT, MON.

JOHN BEATSON, DERBY.

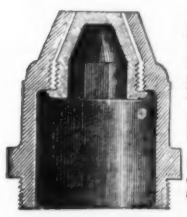


IRON AND STEEL RAILS, of all sections, from 10 to 82 lbs. yard, new, defective, or second-hand.
POINTS AND CROSSINGS, FISH PLATES, BOLTS, NUTS, CHAIRS, AND SPIKES. LOCOMOTIVE ENGINES AND MACHINERY.
MALLEABLE AND PIG-IRON OF ALL KINDS.
Delivered at all Ports and Railway Stations in Great Britain.
A SECONDHAND SIX-WHEELED TANK LOCOMOTIVE FOR SALE.

SMITH'S HEARTH.
NO BRICKWORK REQUIRED.
PRICES FROM £6.15. NETT.
FREE on G.N.R.
CAN BE TAKEN DOWN & SET UP AGAIN IN ½ AN HOUR.



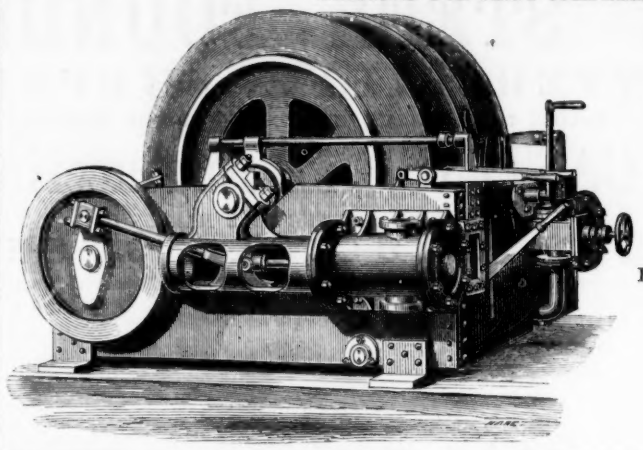
FUSIBLE PLUGS.



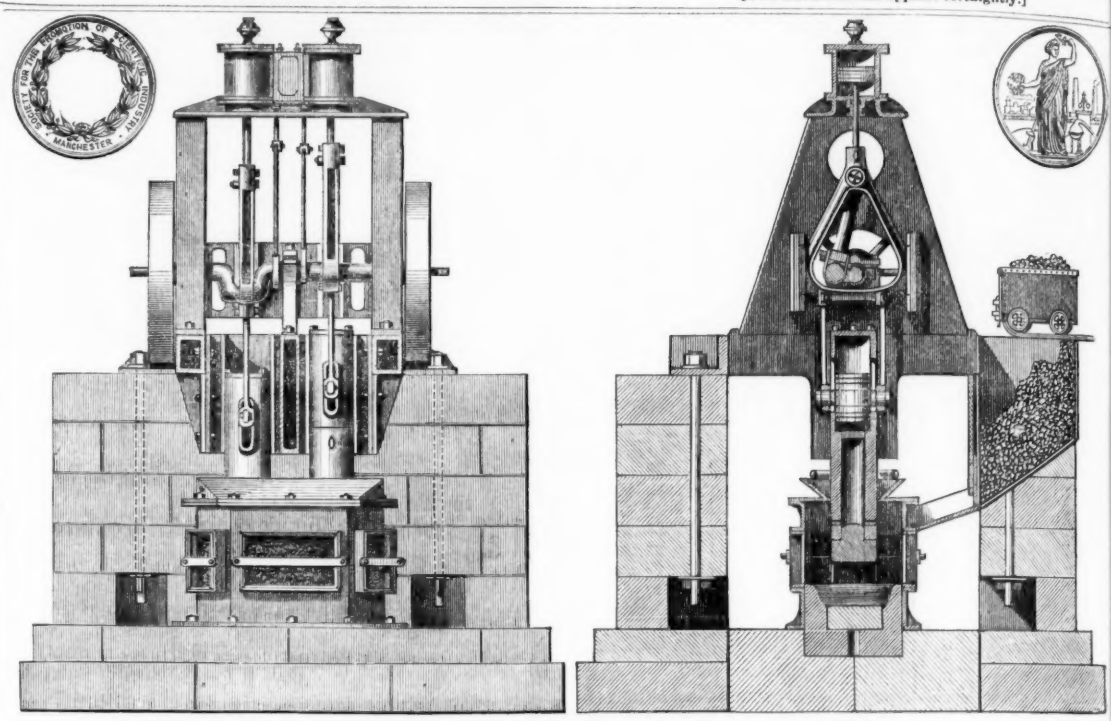
THE NATIONAL BOILER INSURANCE COMPANY (LIMITED), 22, ST. ANN'S SQUARE, MANCHESTER, have acquired the PATENT of most important IMPROVEMENTS in DOUBLE CONE FUSIBLE PLUGS.
When fusion occurs a new cone is immediately inserted without removing the manhole cover, and the boiler at once re-started.
The fusible metal is quite protected from deterioration by fire, entire detachment of the inner cone and a large clear opening is secured in case of deficiency of water, and serious injury or explosion of the boiler prevented.
No other Plugs possess such valuable advantages.
For full particulars, apply as above.

ACCIDENTS BY FLOOD AND FIEL
ACCIDENTS OF ALL KINDS
May be provided against by a Policy of the
RAILWAY PASSENGERS' ASSURANCE COMPANY.
THE OLDEST AND LARGEST ACCIDENTAL ASSURANCE COMPANY.
Hon. A. KINNAIRD, M.P., Chairman.
Subscribed capital, £1,000,000. Annual income, £205,000.
£1,120,000 have been paid as compensation.
A fixed sum in case of death by accident, and a weekly allowance in the event of injury, may be secured at moderate premiums.
Bonus allowed to insurers of five years' standing.
Apply to the Clerks at the Railway Stations, the Local Agents, or—
64, CORNHILL, LONDON.
WILLIAM J. VIAN, Secretary.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,
DESIGNED FOR USING COMPRESSED AIR OR STEAM,
SIMPLE, COMPACT, PORTABLE.
Silver Medal, Royal Cornwall Polytechnic Society, 1876.



No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, with 2 ft. 6 in. drums.
Larger sizes made with two cylinders.
A,— 6 in. double cylinder, with 2 ft. 3 in. drums.
B,— 8 in. " " 3 ft. 0 in. drums.
C,—10 in. " " 3 ft. 6 in. drums.
D,—12 in. " " 4 ft. 6 in. drums.
MANUFACTURED BY
THE USKSIDE CO.,
ENGINEERS, MAKERS OF PUMPING AND WINDING MACHINERY, AND FORGINGS OF EVERY DESCRIPTION,
NEWPORT, MON.
Agents for the six Northern Counties—
TANGYE BROTHERS, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
[This Advertisement appears fortnightly.]



SHOLL'S PATENT DIRECT-ACTING
PNEUMATIC STAMPERS,
For Pulverising Tin and Lead Ores, Gold Quartz, &c.,
SOLE MAKERS FOR CORNWALL,
N. HOLMAN AND SONS,
ST. JUST FOUNDRY, NEAR PENZANCE, CORNWALL.

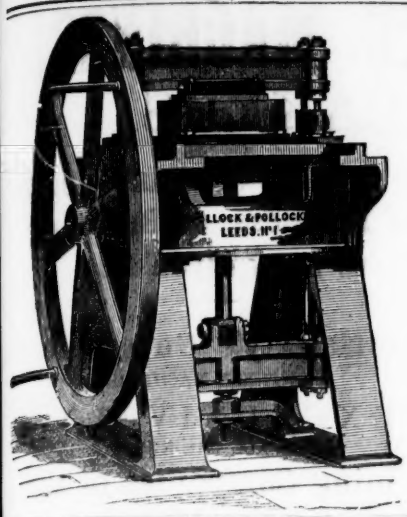
All objectionable features of "wear and tear" common to the original and existing Pneumatic Stamps (driven by belts) are removed in this patent, and leather bands and stuffing boxes entirely dispensed with, the pneumatic piston being reciprocated into the compressing chambers by direct-action from without. These double machines are guaranteed to be of the capacity of 36 ordinary heads of cam and lifter stamps, and engineers will at once see that, inasmuch as the power is directly applied to its work (without the medium of belts and other gearing), the minimum consumption of coal (all other conditions being equal) must be the result.
The COST OF THESE MACHINES (including boiler) is about ONE-THIRD OF THE ORIGINAL CAM AND LIFTER STAMPS, to do the same work.
ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.
Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER.
MINING AND OTHER MACHINERY CONSTANTLY ON SALE,
NEW AND SECOND-HAND.

British and Foreign Safety Fuse Company,
REDRUTH, CORNWALL,
MANUFACTURERS OF

SAFETY FUSE,
FOR MINING AND QUARRYING PURPOSES.
PRICES ON APPLICATION.

THOMAS TURTON AND SONS,
MANUFACTURERS OF
MINING STEEL of every description.
CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL.
MINING TOOLS & FILES of superior quality.
EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.
LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.
SHEAF WORKS AND SPRING WORKS, SHEFFIELD.

LONDON OFFICES.—35, QUEEN STREET, CITY. PARIS DEPOT—12, RUE DES ARCHIVES.
NEW YORK STORE—102, JOHN STREET.



POLLOCK AND POLLOCK,

LONGCLOSE WORKS, NEW TOWN, LEEDS,

POLLOCK'S PATENT BRICK PRESS,

The New "XL" Brick-Making Machines,

THE CHEAPEST AND BEST IN THE MARKET.

Improved Grinding Pans, with patent self-acting delivery.
Vertical and Horizontal Engines.

COLLIERY ENGINEERS.—WINDING ENGINES OF ALL SIZES.

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London Office —155, Fenchurch Street, E.C.

JOSEPH FENTON & SONS,

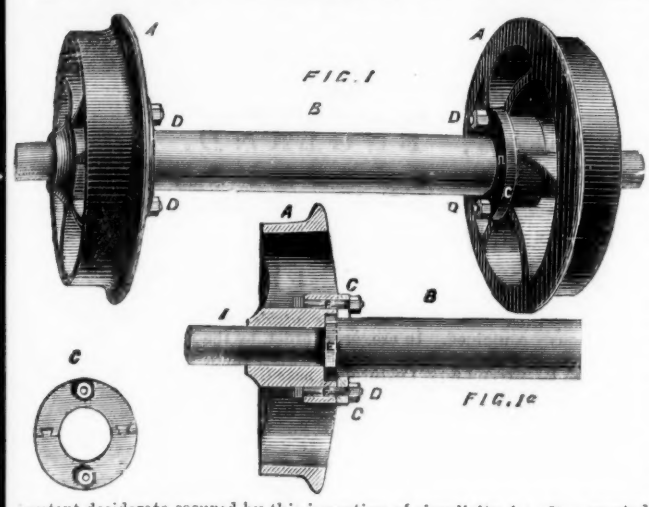
SYKES WORKS, SHEFFIELD, and 118, Cannon-street, LONDON, E.C.,

MANUFACTURERS OF

CRUCIBLE CAST STEEL CASTINGS,

HAVE PLEASURE IN CALLING THE ATTENTION OF THE MINING WORLD TO THEIR

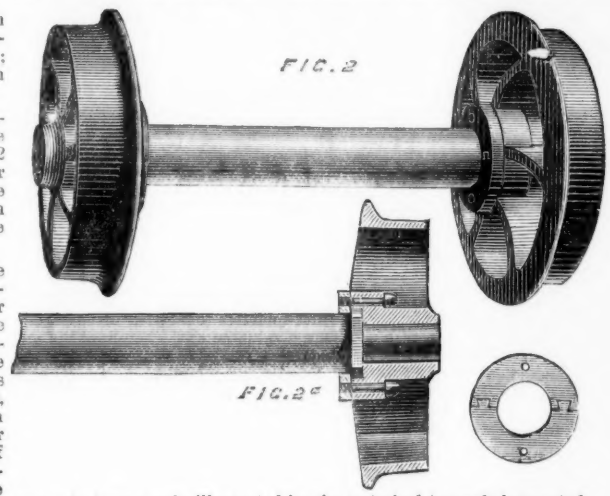
Patent Method of Fitting up Cast Steel Wheels and Axles.

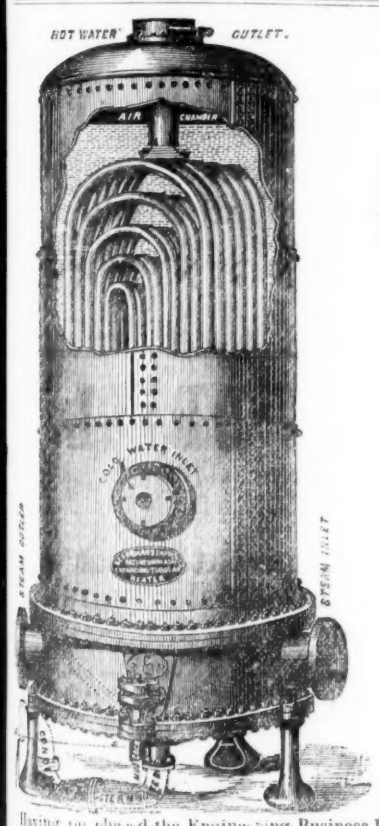


Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle. Figs. 2 and 2a show a longitudinal view and plan of a pair of corf wheels fitted up for inside bearings. The washers are secured to the boss of the wheel in outside bearings by bolts and nuts, and in inside bearings by set screws.

The advantages of the above system are:—A, the singular simplicity of fitting—enabling any inexperienced person, with the aid of a spanner or screw-driver, to detach the wheels from the axle or fit them together in a very short time. B, perfect solidity, the wheels and axles becoming as one piece. C, durability, no need or putting the wheels or axles into the fire, under any circumstances, which is so detrimental to wheels, rendering them remarkably brittle, and which under other systems are detached from the axle by the aid of fire. D, economy in fuel and wages, saving hundreds of pounds yearly to large coal owners. The important desiderata secured by this invention of simplicity (so often wanted in patents), solidity, durability, and economy, have not only been amply illustrated by the technical journals interested in the progress of mining operations in this country, but have at once been fully recognised by leading authorities in the mining world.





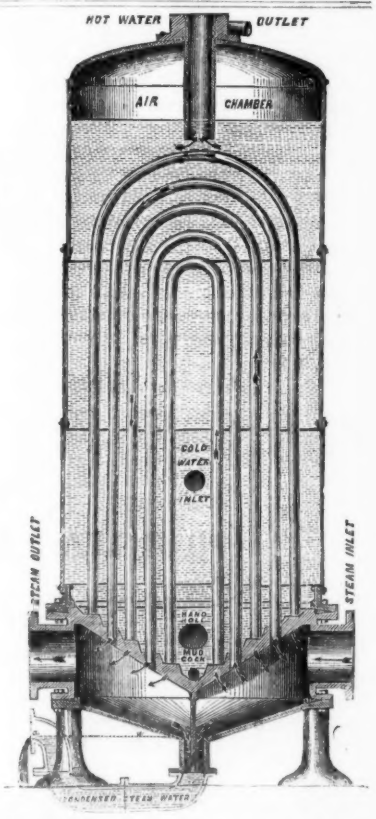
IMPORTANT.

JOSEPH WRIGHT AND CO.

(LIMITED),

NEPTUNE FORGE ENGINE AND BOILER WORKS,

TIPTON, STAFFORDSHIRE,



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL to METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER-WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using TWO HUNDRED AND THIRTY-THREE of these Heaters.

H. R. MARSDEN, PATENTEE AND ONLY MAKER OF THE WELL-KNOWN BLAKE MACHINES,

ORE CRUSHERS AND STONE BREAKERS,

WITH THE

New Patent Reversible

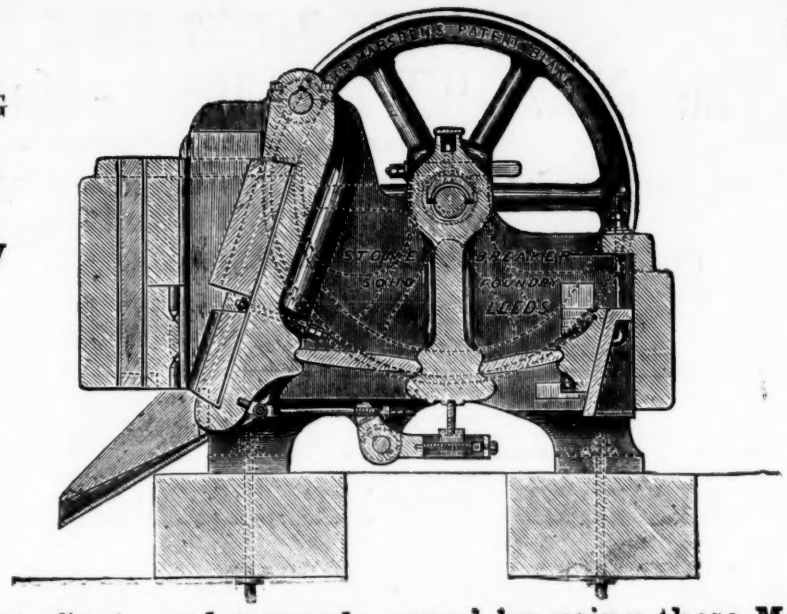
CRUSHING OR CUBING JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR MIXTURE OF METAL, WEARING

Four times longer than any other.

60 GOLD AND SILVER MEDALS.

OVER **2000** NOW IN USE.



For Crushing to any degree of Fineness, or Breaking to a required size.

Her Majesty's Government

USE THESE MACHINES

EXCLUSIVELY,

ALSO ALL THE GREAT

Mining Companies of the World.

H. R. M. has long observed the want of cheaper machines,

STONE AND ORE CRUSHERS,

And has at length, by means of improved appliances for the production thereof, been enabled to reduce the prices, yet keep up at the same time the well-known strength of construction. Reduced prices on application.

FIFTY per Cent., and upwards, saved by using these Machines.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

6, Queen-street-place, May 10, 1877.

DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully, JOHN TAYLOR AND SONS.

H. R. Marsden, Esq.

Royal Agricultural Show, Liverpool, July, 1877.

DEAR SIR,—I have broken over 40,000 tons of very hard LIMESTONE into ROAD METAL, for the Newport and other Road Trusts, in your PATENT STONE BREAKER, AND ALL WITH ONE PAIR OF JAWS, which are STILL IN USE. I do not think at all, but am quite sure yours are the only Machines which fully perform the work you set them out to do, and there are none in the Show can at all compare with them. Yours, truly,

H. R. Marsden, Esq. WILLIAM PRICE, Contractor, Gold Cliff, Monmouth.

INTENDING BUYERS ARE CAUTIONED AGAINST PURCHASING OR USING ANY INFRINGEMENT OF THE NUMEROUS PATENTS OF H. R. MARSDEN.

ILLUSTRATED CATALOGUES, TESTIMONIALS, and every information, on application to:—

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ONLY MAKER OF SAULT'S PATENT SYPHON CONDENSER.

TO COLLIERY AND MINE OWNERS.

R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwts. "dead" weight per corve. Will hold 2 to 3 cwts. more coal than the ordinary kind, *without increasing the outside dimensions.* Can also be used as water tubs, and in thin seams are invaluable, as the height of the corves can be reduced without diminishing quantity of coal previously contained. In use, or on order, by the following coalowners—

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Messrs. CLAYTON and SPEIGHT, Farnley, near Leeds.
Messrs. JAS. WORMALD and SONS, Rawdon, near Leeds.
KINGSWOOD COAL AND IRON CO., near Bristol.
MIDDLETON COLLIERY CO., near Leeds.
FRYSTON COLLIERY CO. (Limited), Castleford, near Leeds.
HOWDEN CLOUGH COLLIERY CO. (Limited), near Leeds.
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HARDWICK COLLIERY CO., Clay Cross, near Chesterfield.
NEWTON COLLIERY, near Castleford.
WEST YORKSHIRE IRON AND COAL CO. (Limited), Tingley, near Leeds.
WM. BAIRD and SON, Coatbridge, near Glasgow.
BETTISFIELD COLLIERY COMPANY, Bagillt, Wales.
EDFORD COLLIERY COMPANY, near Bath.
Messrs. RUSHFORTH and Co., Adwalton, near Leeds.
Messrs. JAS. FUSSELL, SONS, and Co., Frome, Somersetshire.
T. VAUGHAN and Co.'s TRUSTEES, South Medomsley Colliery; and others.

R. HUDSON, Engineer and Ironfounder, Gildersome Street Foundry, near Leeds *(Five minutes walk from Gildersome Station, G.N.R.)*

The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY ONES that have been SUCCESSFULLY WORKED in the MINES of CORNWALL. At DOLCOATH MINE, in the HARDEST known ROCK, a SINGLE MACHINE has, since its introduction in July, 1876, driven MORE THAN THREE TIMES the SPEED of HAND LABOUR, and at TWENTY PER CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together, and at a proportionately increased speed. They are strong, light, and simple, easily worked, and adapted for ends and stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS, and all necessary appliances for working the said Drills.

Apply to—

LOAM AND SON,

LISKEARD, CORNWALL.

HEPBURN'S PUMP LEATHER WATERPROOF

By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

I. AND T. HEPBURN AND SONS,

TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE MANUFACTURERS,

LONG LANE, SOUTHWARK, LONDON

Prize Medals, 1851, 1855, 1862, for

MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

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THE SOUTH WALES EVENING TELEGRAM (DAILY), and SOUTH WALES GAZETTE (WEEKLY), established 1857,

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The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general.

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